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Porosity and Poiesis across fragile membranes: patterning fluid arrangements in human biology

Submitted by

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Statement of Originality

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Table of Contents

List of Figures

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Abstract

I find that making sense of what confounds us is often instinctual, preconditioned and resolute, and without conscious thought. This practice-led project is grounded in difficulties during my human science studies when in a moment of clarity, I envisaged the complexities of human biology within a confined order of patterning. Out of a perceived chaos grew a system using colour and ordering to sequence fluid arrangements. My project investigates the proposition of autopoietic patterning in dynamic human biology. I consider the visually creative potential of fluid arrangements inherent in physiology that drives seepage across fragile membranes.

My investigation focusses on the human organism's visual qualities in its smallest, less obvious, yet visually fascinating parts. I explore notions grounded in microscopic observations that lead to greater emphasis on the performance and interactions of materials in the studio, referencing observations of human matter. I frame this studio investigation within conceptions of material agency offered by new materialism. My creative output is a speculative study expressing human physiology in colour and forms of fluid patterning. I use pigments in a viscous medium that allows additions of colour to flow between applications. The proposition is strengthened in the studio in an extended use of diagnostic tools; a microscope, glass-slides, a petri dish. I build on empirical data obtained from clinical observations in the pathology laboratory. The referent in more recent works is in historic models of biological complexity that captured the microscopic in x-ray diffraction pattern – a revolutionary process that advanced our understanding of the structure of matter. I frame this expression of the human organism and its processes in illuminated colour and transparent layering addressing this significant time in history, capturing the microscopic and the speculative in two and three-dimensional models.

I situate my project in contemporary artworks from artists that support my concepts. I include Justine Cooper, Annette Messager, and Mona Hatoum for their methods addressing invasive medical interventions and our failing

bodies. Anna Dimitriu engages with biology and bioscience with a focus on bacteria and bioinformatics. My engagement with colour identifies with James Turrell's use of colour and light in installations creating affective environments. The immersive qualities of Mark Rothko's and Barnett Newman's colour fields inform my staging of embodied encounters that evoke seepage across boundaries. Dustin Yellin's corporeal sculptural works elicit an embodied experience that inspirits my use of layered materials.

The project explores theories amplified in feminist writings that challenge and repudiate the gendered notion that biological matter is selectively passive or inert, so encouraging others to embrace dynamic biology at the phenomenological level. In addition, I embrace Stacy Alaimo's affective proposition that we inhabit trans-corporeality within the space where the fleshy corporeal human and its complex systems are inseparable from nature and environment. My project bridges the highly intellectualised and abstracted conceptions of human biology with an affective encounter with materiality, immersing viewers in the biology they often fail to acknowledge.

Introduction

> *Stepping hesitantly into the wet-lab, I am distracted by the glare of intense lighting on shiny white tiles. I feel the hands of a study-mate grasping at my new lab coat. I reciprocate the gesture. Then I see it, beneath voluminous white sheets; prostrate, lumps and bumps on shiny metal trolleys. Still, death is concealed and faceless. Unveiling reveals not abstract notions of death but its victims. I watch young adults, students, withdraw from death, backs pressed hard against the cold, shiny white tiles; they maintain a safe distance, as though death might be catching. I share the fear.*

Making sense of what confounds us is often instinctual, preconditioned and resolute, and without conscious thought. I could not have known that this deeply affective moment laid the foundations for my project. This moment of abjection delivered insight to a new world and disturbance of my existing world. From the white-tiled room and the stillness of death, I found a way to make sense of what confused me in an instinctive approach; to see the dynamic processes of the human organism within a confined order of colour and pattern. The approach stemmed from my inability to immediately recall complex detail of human anatomical structures and physiological processes in human science studies. As a visual thinker, I responded to the challenge by developing a colourful flow-chart style study tool.

Out of a perceived chaos grew a system using colour and ordering to sequence the body's fluid arrangements. My research extends this insight investigating the proposition of dynamic autopoietic patterning in human biology. The project's focus is discovering ways to make tangible the intangible, to satisfy a need to express biological processes that once disturbed but now intrigue me. I invoke the visually creative potential of fluid arrangements inherent in physiology that drives seepage across fragile

membranes. A paradigm shift changed forever how I imagine the microscopic qualities of the human organism.

My visual art practice tests ways to convey my thoughts with the aim to encourage others to consider the human body's invisible yet dynamic porosity and its fluid boundaries. I identify autopoietic patterning in the human body, focussing on the organism's fluidity. Using concepts of colour, porosity, poiesis, fluidity, and fragility, I re-envision representations of human biology. I consider the visually creative potential of fluid arrangements located within human physiology and question how arrangements form by way of vital mechanisms situating porosity, poiesis, and fluidity affecting viscera and fragile membranes. Throughout the investigation, I explore how and why patterns form during the process of autopoiesis building on empirical data when unease and illness become visible in diagnostic screening. Porosity of the organism and autopoietic patterning is evidenced when human physiology repeats its processes each millisecond in replication and equilibria. Porosity is integral to the project, providing connectedness of biological patterning and fluidity in a complex continuous weave of structures and processes responding constantly in the maintenance of equilibria. My investigation draws together colour and patterning with my research revealing a gap in creative expression of the microscopic human body.

I explore processes grounded in microscopic observations that lead to greater emphasis on the performance and interactions of materials in the studio. My creative output is a speculative study of human biological processes expressed in colour and a form of fluid patterning. The proposition was strengthened in the studio in an extended use of tools of diagnoses found in the laboratory in work that expands on the speculative to build on empirical data obtained from clinical observations in the pathology laboratory. My art engages theory and science through exploration of the porous quality of the material of the human organism. I draw on Estelle Barrett's *Materiality, Effect, and the Aesthetic Image* (Barrett 2013), that artistic practice is experiential, informed by our daily activities.

Barrett (2013:64) proposes that emotional, personal, and subjective matters often motivate artistic practices, that it '. . . proceeds not only on the basis of explicit and exact knowledge, but also on tacit and experiential knowledge', and, 'Artistic experience therefore, occurs as a continuum with normal processes of living and is derived from an impulse to handle objects and to think and feel through their handling' (2013: 66). The aesthetic image emerges from this process in what Barrett determines is '. . . an image that is heterogenous in that it permits a *knowing* that exceeds what can be captured by the symbolic' (2013: 66). Further, Barrett responds to John Dewey's (1980) contention, that knowledge, whether emerging from art or science, is experiential, hence, knowledge gained through daily existence and activity is captured in the artwork through creative practice (Dewey 1980:66).

Development of the project connects art to anatomy and physiology and to other contributing disciplines and concepts; psychology, feminism, and embodiment. I liken my early feelings in the wet-lab, surrounded by cadaver material, to Paul Thek's (1966) summation of bodily interactions. Thek writes, 'I try to look closely at something that is disturbing and detach myself from it' (Thek 1966:122). I concur with psychoanalyst Donald Winnicott (Winnicott 1971:86) in identifying ways to cope with reality in the psychological mechanisms of what Kent Bloomer (Bloomer 2000:86) calls metamorphosis; regarded as an important part of a healthy engagement with the world and with our functioning biological and anatomical bodies. In addition, I relate to Bloomer's (2000:38) claim, that systems of ornament (patterning) seek edges, voids, and openings of the places they might 'constellate their repertoire . . .'.

For anatomists, the term 'gross anatomy' refers to an overview of the physicality of the entire human body. It is important to me to first understand the human organism at the cellular level, beginning with cellular respiration and reproduction of human tissues. This is the material from which each part of the human organism is made. Studies in anatomy explore the material the structures – skeletal and muscular – that keep us upright; as well as the body's systems and the organs constituting much of the systems. Tissues

and cells might be overlooked by non-scientists, or described as less interesting and captivating when thinking of human anatomy. Contrarily, my investigation focuses on the microscopic level of the human organism, its connective and fascial tissue, blood, mucous, and serous membranes lining its organs and its dark cavities. Fascinating things occur in the body's interior ecology, where it provides the perfect environmental conditions for non-human 'other' to seep and migrate through delicate and porous membranous walls to colonise within sticky spaces where tissues engage in a continual cycle of renewal in autopoietic patterned replication.

The project's concepts are complex and a consequence of two experiences. The first is foundational; the affective moment I was overwhelmed by complex anatomical structures and biological processes when I was introduced to wet-lab cadavers. The second is adjunctive, but no less affective, paralleling and complimenting the first in observations during an arts residency at the Launceston General Hospital's Pathology Department. The second experience is attendant to the foundational experience in so much as both form the core of the project and an aesthetic reference point for studio engagement.

As an artist (with a background in biomechanical dysfunction) the human organism provides fertile ground for conceptualising nature's processes. In De Anima (c350BC) (Aristotle 2014), Aristotle stated, 'There is no thought without an image'. Artists and scientists work in similar ways even though the products of our research may be different. Visual artists demonstrate increasing interest in scientific practice, method, and in its images on collaborative projects. I refer here to Western Australia's art/science collaborative SymbioticA laboratory, where artists and scientists unite in projects bringing science into public awareness. Science and art appear to occupy conflicting positions hence, I was surprised to learn during the AIR experience how readily scientists demonstrate interest in artistic representation of science. Science, its theories and artefacts are highly visual, playing to the needs of artists interested in science.

Visualising and imagining are as important to science as to the visual arts. I would suggest that without imagination and some process of visualisation, scientific discoveries might not exist; scientific inquiry requires imagined outcomes. The Bauhaus and Futurist movements adopted science and technology as a breakaway from traditional fine art that they saw as constraining (Belk 1966:2-36). Belk argues that early expressionists used art as an escape from the alienating influences of science and technology. Science and art now find common ground, converging in collaborative projects where scientists and artists demonstrate mutual interest through shared knowledge. The mutual curiosity I experienced in the pathology laboratory supported my artefacts of observations when scientist interest in my project mirrored my interest in their practices of harvesting bodily material and diagnostic techniques.

While a number of artists, including Anna Dumitriu, Helen Chadwick, and Svenja Kratz, employ actual human and other bacterial material in construction of their art, few artists construct art visualising speculative microscopic biological material. Other work that constructs depictions of the medicalised and biological body, such as Justine Cooper's RAPT II, uses different scales of space and time. Throughout the research for this project, I failed to discover artists whose art employs concepts of colour and patterning in visualisations of human material. Hence, a gap exists to which I contribute emergent speculative material artefact in coloured and patterned imagery suggesting microscopic human material and the trans-corporeality of human systems and non-human entities.

In *Section One*, I describe the human body as a dynamic organism including its process-driven characteristics in biological systems and structures evidenced in studio output that draws on observations of biological science, embracing the notion that biological matter is dynamic, vital, and energetic. These views are amplified in the work of feminist 'new materialists' that challenge and repudiate the gendered notion that biological matter is selectively passive or inert. In addition, I aim to bring the materiality of the human organism into the broader scope of feminist practice relying on

personal observations contextualised through the feminist writings of Stacy Alaimo (2008), Susan Hekman (2008), Estelle Barrett (2013), Barbara Bolt (2013), Sara Ahmed (2008), Anne Fausto-Sterling (1992), Elizabeth Grosz (1994), and others, whom encourage us to embrace the dynamic human organism's materiality and its processes.

Section One points also to William Connolly's (2013:32) assertion that it is time, perhaps, to embrace and forge biology and critical philosophy and to draw sustenance from contemporary thinkers. My concept connects Connolly's assertions with Jeffrey Deitch's (1992:11) proposition that, one day, artists will create art that is also biology. I investigate notions of patterning in poiesis and autopoiesis within bodily processes. I touch here on biological thermodynamics as it relates to pattern-forming processes. Kent Bloomer (2000:39) asserts that pattern is an important element of daily life; it gives form to the formless. Another core element in the formation of biological patterning is flow. Philip Ball tells us that, in life, flow never stops, describing also the meander patterning of flow in the everyday. I demonstrate here why flow is vital in biology and in the formation of structures in skeletal systems. D'Arcy Thompson (2008) and Ian Hunt (2000) compare organic and inorganic material using examples of viruses and other packaged proteins.

I provide a broad and diverse range of artistic practice beginning in *Section One* with James Turrell's specialised use of colour and light in addition to the psychology effect of highly illuminated and saturated colour on the human psyche. Where Turrell's colour and light persuasions are mathematically calculated, my use of colour is instinctual and a practical means to make sense of complications. Colour is also personally pleasurable. I further explore notions of colour examining *Chromophobia* (2000:97), in which David Batchelor suggests that the antithesis of chromophobia is chromophilia.

I examine porosity, micro-organisms and trans-corporeality in *Section Two* in writings from Stacy Alaimo, (2008 & 2012) and Susan Hekman (2008), exploring interchanges and connections within the human system. Here, I unfold the experience of my arts residency with the Pathology Department of

Launceston's General Hospital exploring why I chose to audit the laboratory, how my observations helped my project, and how I use gathered and used visual data.

Expanding on the subject of bacteria and artist's engaging with biology, I include Anna Dumitriu, whose practice fuses sculpture and bioscience with a focus on bioinformatics (chemotaxis) in *Communicating Bacteria* (2009), demonstrating how art and science, artists and scientists, collaborate in cutting-edge scientific inquiry. Helen Chadwick's *Wreaths to Pleasure* circular images allude to biology's cellular and molecular activity in stark combinations of noxious fluids and colourful blooms resembling funerary wreaths. Chadwick's wreaths, seductive yet repellent, engage the viewer in the abjectionable nature of the toxic with the beautiful. The art of socio-political feminist Mona Hatoum captures and uses the human body and the artist's spirit of survival in delicate blown-glass trapped in steel cages and using her own biology in projections of her body's interior. My focus here is on anatomy, biology, and fragility from a feminist perspective.

Section Two features concepts of creativity, consciousness, embodiment, and clues to sentience and the body's central role in shaping experience in David Peat (2012) and Drew Leder (1990). Elizabeth Grosz's (1994) diverse forms of body image, disintegration and reorganisation in the visual perceptions of Gestalt theory resonates with Justine Cooper's art. Cooper's work resonates also with a key concept of manipulated data and how the human body can be expressed using malleable digitised data in a new bodily order. Annette Messager's eccentric menagerie of creations delivers a sense of floating through the human body's visceral space and movement between internal organs. Messager uses the element of fluid movement to suggest the vitality of life paralleling this project's notions of the dynamic human organism. Grosz highlights loss in theories of separable bodily objects; that parts of the body are never completely separable from it, evidenced by Svenja Kratz who is inspired by the shifting understanding of life and death in response to contemporary biotechnologies.

In addition, I aim to bring the materiality of the human organism into the broader scope of feminist practice relying on personal observations contextualised through the writings of Stacy Alaimo (2008, 2010 & 2012), Barbara Bolt (2013), Estelle Barrett (2013), Anne Fausto-Sterling (1992), Samantha Frost (2011), Luce Irigaray (1985), Elizabeth Grosz (1994), Lynda Birke (2000), Michelle Meagher (2003), Sara Ahmed (Ahmed 2008) and others, each whom invites and encourages feminists to embrace the biology of the human organism at the phenomenological level and to accept the effects of hormones, growth, aging, illness, and all lived experiences impacted daily on and by biological systems. Fausto-Sterling solicits, provokes, and challenges feminist thinkers, writers, and philosophers to consider, intellectually, the biology they often fail to acknowledge, demanding a rethink of many deeply held assumptions about causation that have structured feminist critique and the body's materiality (Fausto-Sterling 1992:6).

Samantha Frost (2011) claims that for feminist philosophers and theorists, the biology of the human organism is so vexed that, in philosophical and theoretical work, it is often ignored. (Frost 2011) Karen Barad supports this stance while Elizabeth Grosz's (1994) philosophies engage with psychological and emotional matters of material loss. Jones and Whittaker (2009:23-35) pose the interesting but sensitive question; does bodily material lose relevance when it is increasingly fragmented? This, and other notions of death and loss are explored by Grosz (1994:81) in Maurice Merleau-Ponty's (1962:81) theory of phantom limb and in Sigmund Freud's theories on narcissism, hypochondria, neurasthenia, and empathy.

Stacy Alaimo's purpose is to bring the materiality and trans-corporeal nature of the human organism to the forefront of feminist theory and practice. This stance is supported by feminist biologist Lynda Birke(Birke 2000) who points to chemical pollutants as endocrine disrupters and a source of concern for women's health. Michelle Meagher (2003) examines the aesthetic of disgust using Jenny Saville's corporeal paintings as the referent for what the writer claims is our '. . . unambivalent reactions to abjection', (Meagher 2003) I refer

also to Robyn Longhurst (2001) and Julia Kristeva's *Powers of Horror,* (Kristeva 1980), described by Kristeva as '. . . a massive and sudden emergence of uncanniness . . .'. These views lead me to feminist biology and the Gender Studies Group (1988), Lynda Birke (2000), Maryanne Kline-Horowitz (1976), David Freedman (1992), and Emily Martin (1991), in amusing yet disturbing old-wife-tales', gendered theories and bias in patriarchal views of active-passive man-woman in reproductive biology.

Section Three of my paper explores William H Ittelson's (1996:171-187) assertions and discussion on themes of markings, visual systems, adaptive visual data, and David Peat's (2012), explanations of the differences between consciousness and awareness. Consciousness descends deep into the realm of pure matter which is not open to general awareness; awareness is the domain of the fleeting and transitory. Philip Ball (2009) describes fluidity and fluid dynamics. Using the disciplined dynamics of flow, and a thought process that questions and demonstrates patterning within fluid movement, I include Brendan Monroe's art. I share Monroe's mindset where he brings unconscious knowledge into consciousness through creativity.

The embodied experience is brought into context using Mark Rothko's and Barnett Newman's works demonstrating how a strong work can draw a viewer into its depths of colour in meditative experiences that transcend objectivity. Continuing the theme of what constitutes a meditative experience, I explore the material workings of the mind in embodiment in Robert Adkinson (2009), Robert Pepperell (2011), EH Gombrich (1979), Elizabeth Grosz (1994), Francois Pluchart (1974), including a humorous poem by Billy Collins (Patterson 2003)). In a different view of the human body, I include Ian McKeever's abstract language of bodily representation. Here I compare the breathtaking qualities of monumentally sized works with the intimately detailed qualities of small artworks. I identify a common theme in the unpredictability of *chance* in Gerhard Richter's art using the artist's Cologne Cathedral windows as an example of colour in random sequencing, and chance in patterning.

Formal or prescribed patterning is examined in Byzantine and Islamic art, (Hattstein 2010) seen symbolically through orderly arrangements, in patterns and motifs often defined as culturally defined markers of humanity. I compare the traditional cultural elements of Islamic art to the contemporary art of Monir Shahroudy Farmanfarmaian whose works employ culturally recognised symbols in arches, domes, the formality of patterning, and in symbols of a nomadic lifestyle. This artist demonstrates the strength and depth of ancient culture, that symbols of culture persist to be reused, reconfigured, and reappreciated.

I conclude *Section Three* with a personal account of my visit to The Middle East, to The Louvre Abu Dhabi, where I sat under the museum's dome; a porous entity protecting its interior space; its living biome. Light filters in to the interior in daylight hours; in a reciprocal or reverse osmotic-like action, light filter out during night time hours.

In *Section Four*, I deliver an in depth look into my methods in the studio, and its output in sub-headings detailing each of my four exhibitions for this project. This section evidences the project's development and how I arrive at the body of work I present for examination; the experiments that I embraced and the experiments that I rejected. In this section, I make notions of human biology explicit through microscopic observations, leading to greater emphasis on how materials perform and interact in the studio; the expressive potential of human viscera on glass emphasised in magnification. Tension between the real and the imagined is represented in layers of conceptual human viscera as it might be examined by scientists and conceptualised in the studio. I frame this studio investigation within conceptions of the material agency offered by new materialism. I describe the human organism's qualities in its smallest, less obvious, yet visually fascinating parts. I aim to develop a unique visual system and a process that provides affective environments as a reminder that life hinges on precariously balanced systems.

Throughout this paper, I examine each experience leading to engagements with concepts, themes, theories, and observations; each exploring and particularising the threshold between how I see complex biology with my eyes and how I see it in my mind; a site of speculative but empirically supported bodily notions in a simplified human organism.

Section One: the human organism's dynamic systems

I began this project with an emphasis on the human as a dynamic organism in its process-driven biological systems and structures. This is evidenced in my creative work that draws on observation of biological science, embracing the notion that biological matter is dynamic, vital, and energetic; views amplified in the writings of several feminist 'new materialists', each encouraging us to embrace the dynamic human organism's materiality. I explore core elements of the project as they relate to my concept of human biology. These are, colour, pattern, porosity, poiesis, fluidity, and fragility.

The entire human organism, from its deepest crevices and tissues, is neither passive nor mechanical. Rather, it is dynamic, actively responsive in both regulatory exchange and homeostatic equilibria whilst, at the same time, playing host to non-human entities. Stacy Alaimo (2008) argues that if we are to understand nature as something other than a passive resource for humans to exploit, and if we are to understand the human body as something other than '. . . a blank slate awaiting the inscription of culture, we must reconceptualise bodies and natures in ways that recognise their actions'. Alaimo contends that the agency of biological bodies is crucial for understanding biological entities as complex, contingently ever-modifying, actively responsive and dynamically regulatory. Alaimo questions; 'How can we rethink matter as activity rather than passive substance' (Alaimo, S 2008:239)? Alaimo's question is situated within a recent wave of feminist theory that is, indeed, rethinking materiality.

The focus of my project on the dynamic nature of human biological processes constructs an immediate and immersive experience in visualisations of bodily processes that elide conventional depictions of embodiment. Alaimo and Susan Hekman (2008:3) claim that a post-modern retreat from materiality had serious consequences for feminist theory and practice and, although there has been an outpouring of scholarship on the body over thirty years, the writers suggest most of the work in this area is confined to analysis and

discourse about the body. The writers are not denying the ongoing importance of a discursive critique and rearticulation for feminist scholarship claiming however, the discursive realm nearly always constitutes foreclosed attention to lived bodies with attention on evolving corporeal practices (Alaimo, S, Hekman, S., 2008:3-23).

In Sara Ahmed's (Ahmed 2008) position paper titled 'Open Forum Imaginary Prohibitions: Some Preliminary Remarks on the Founding Gestures of the 'New Materialism'', the author claims that several feminist writers gather around a gesture of distaste for biological detail in feminist writings; their reluctance to engage with biology, offering what Ahmed claims is a reductive history of feminist engagement with biology and materialism (Ahmed 2008:23-29). Instead, Ahmed suggests we appreciate the complexity of feminist work that came before. Ahmed quotes several influential feminist thinkers and writers, including Elizabeth Grosz. Grosz claims we have forgotten not only the body, but that which makes it possible and which limits its actions in the precariously accidental, contingent and expedient, dynamic status of life's messy, complicated, resistant, and brute world of materiality. (Grosz 2012). To remember where we have come from, to remember the body's messy agency, I draw on applications of new materialism to arts practice.

Within a framework of new materialism, I emphasis the dynamic, temporal, and process-driven character of things including human entanglements with the non-human 'other' and its trans-corporeal processes. In her 'Introduction' to *Carnal Knowledge Towards a 'New Materialism' through the Arts,* (2013:5) Barbara Bolt maintains,

> . . . the visual arts engage all manner of material processes in making and assembling art. The material facts of artistic practice appear so self-evident and integral to our understanding of art that it may seem unremarkable to frame them in terms of the material turn (Bolt 2013).

William E Connolly (2013:32) claims appreciation of the fragility of things requires greater sensitivity to how humanity intersects with non-human

processes (Connolly 2013). In ‘The ‘New Materialism’ and the Fragility of Things’, Connolly questions if it is time to embrace and forge an interface between work in the fields of neuroscience, biology, and critical philosophy and in a variety of non-human processes where creativity informs the human sciences. Additionally, Connolly asks if it is time also to embrace and draw sustenance from contemporary thinkers, many whom speak of such things as autopoiesis and creativity, to forge an interface between work in these fields with artistic work, and the human sciences (Connolly 2013). Through a lens of new materialism, I examine the material potential of human matter and corporeality which is embedded in this field of materiality in human biological processes.

Similarly, Alaimo (2008:239) proposes we inhabit trans-corporeality – the time-space where human corporeality, its material fleshiness, is inseparable from nature and environment. Feminist biologist Lynda Birke asserts that we are an embodied organism, part of nature; the body is not hermetically sealed off from its physiochemical environment (Birke 2000:587-599). Birke continues, claiming our environment includes the presence of potentially toxic chemicals. Alaimo and Hekman suggest one option would be that feminism root itself in the realm that has long served as the abject (Alaimo, S, Hekman, S., 2008:3). As an artist within the affective environment in a busy hospital pathology department, I audited each laboratory’s daily inspections of smeared human material. I became aware of pernicious entities, microorganisms and diseases, oft disguised as beautiful flora residing inside a petri dish. My psyche became alerted and afraid that we are not hermetically sealed-off from our immediate surrounds, that we participate in nature’s potential dangers. Through time, non-human entities, the horror of mutilation in bloodied body parts, and the prospect of death, diminished; replaced by a better understanding of both the abject notion of trans-corporeal processes and the allure of nature’s exquisite biology.

Several years ago, as a student of applied science, I studied the subjects of human biology, anatomy, physiology, and chemistry. These studies included exposure to human cadaver material, an encounter which, as recounted in

the opening paragraph of this paper, proved a foundational and affective moment that considerably altered my perception of the human body as a dynamic organism.

In the catalogue for the 1992 Exhibition *Post Human* Jeffrey Deitch (Deitch 1992:11), claimed scientific and social trends were converging to produce new bodily concepts, and that society would soon have access to cutting-edge biotechnology allowing 'us' to make direct choices about how we want the human species to evolve. Deitch suggested that new approaches to self-realisation usually parallel new approaches to art, and history will testify that artists shift concepts in models of human and bodily concepts. It is now routine for humans to alter individual consciousness through reconstruction or conceptual self. Trends that continue to redefine bodily concepts exert influence on artists in new approaches to representations of the body. Deitch claims these new approaches to representations and concepts are not to be found in conventional painting and sculpture rather, the new interest is not formal but conceptual. The 1992 *Post Human* exhibition featured work by artists using processes of breaking-down and reassembling; by isolating segments of the body, new realities are created or emerge, with the use of mannequins in a reformulation delivering a glimpse of post-human art in a suggestion of genetic manipulation. Deitch questioned if artists will one day create art that is also biology.

It is as though Deitch, in 1992, could foresee SymbioticA; an evolving collaborative space of artistic and scientific interrogation of human science that explores and explains biological facts in conceptualised form through the creativity of artists. I discuss an example of SymbioticA's output further into this paper. Acknowledging the fine line between reality and what lives in the imagination, my artwork for this project is speculative, what I imagine supported by what I observe and understand. Feminist scholars, Alaimo, Barrett, Bolt, Fausto-Sterling, Grosz, Barad, Hekman, and others, encourage thinkers, writers, artists, and philosophers to comprehend and embrace analyses of movement, forces, and processes peculiar to human matter and biology. As new materialists, each considers matter and the body not only as

they are formed by the forces of language and culture, but also as they are inherently formative.

My expression of the human organism in this project is speculative and conceptual yet carries literal meaning of what is not normally seen – a simplistic form that visualises complex biological processes which are not observable. The initial source imagery for this project was drawn from the wet-lab, evolved out of a system of patterns I developed as a visual study resource using colours and patterns to simplify and memorise complicated process-driven human systems. An overload of information confounded my ability to recall details of complex anatomy and its equally complex physiological processes, such as fully understanding and recalling the catalytic Krebs or citric acid cycle – a series of chemical reactions used by all aerobic organisms that releases stored energy. During the biochemic cycle, carbohydrates, proteins, and fats combine with oxygen to produce carbon dioxide and water as waste, plus one molecule of ATP, which is energy (Figure 1) (Seeley:846). In addition, the cycle produces precursors for certain amino acids. Recalling so many complex steps might not appear a difficult task, yet each step in the cycle is itself a highly complex cycle (Seeley 2000:846). I developed a system of steps, in the style of a flow-chart using coloured labels. Colour provided me with a logical system whereby, when required, I had a means to recall ordering in combinations of colours, never straying from the same five colours or their order of repetition.

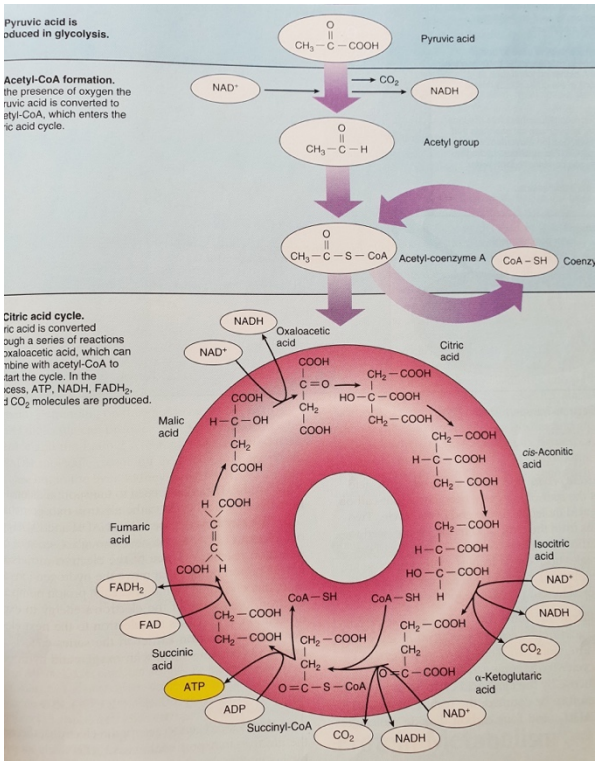

Figure 1: The Krebs or citric acid cycle (Seeley:846)

I was overwhelmed when called upon to recall steps in cyclical biochemical processes in addition to the intricacies of anatomy. Another example of complexity, in this case in anatomy, is the web of veins and arteries contained within the human body (Figure 2) (Seeley:662). Acknowledging that my process of recall is visual, my development of a personal system of study provided organisation, clarity and logic. The tactic, of numbering and colouring steps in cycles, proved an effective housekeeping mechanism for storing and recalling complex information. Using colour sequencing – five colours in rotation – to recall each step within each cycle within each system is, to me, a logical process delivering an essential resource that allowed me to complete my studies in anatomy and physiology.

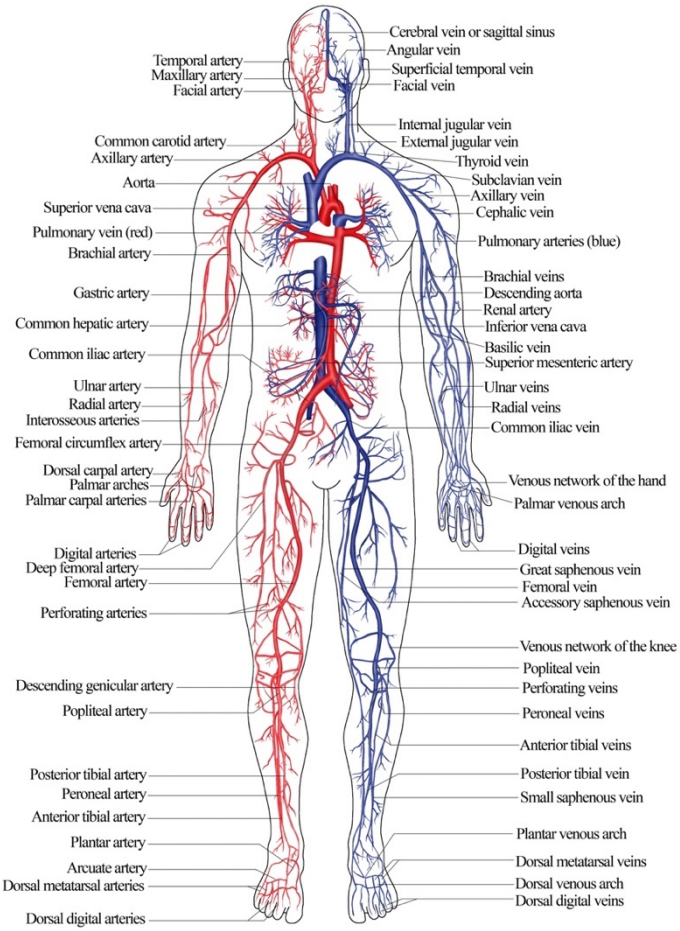

Figure 2: Map of veins and arteries of the human body (Seeley:662)

A second and no less affective source of biological imagery delivered a unique opportunity when in 2016 I broadened my scope in observations of human tissue, invasive entities, and evidence of disease in actual human tissue and body parts during the inaugural arts residency in Launceston General Hospital's Pathology Laboratory. The experience heightened my awareness of microscopic human material to which I responded in articulated data drawn from both the wet-lab and residency experiences, and is discussed further in Section Two. The process of thinking in colour, patterns, and repetition that had become a natural way of ordering my world during my anatomy studies, became validated in the residency during observations of empirical data in microscopic materials and fluids when patterning forms in medical screening interventions in pathology investigations. Evidence of patterning provides clues to the probability of disease or dysfunction. Taking

the observations from my residency, together with my colour-sequencing in speculative studio-led explorations, I use layers of colour to generate expressive and affective imagery describing human material.

My use of colour as a learning strategy reflects my tendencies in my daily life. I am drawn to colour and derive enormous psychological benefit, a great deal of pleasure and positive stimulation from colour. I am fascinated by colour that functions as art, including saturated colour when used relatively and effectively. An effective example of saturated colour in art is James Turrell's colour and light installations in which an audience is both bathed in colour and consumed by light. Turrell's work is commonly identified as light projections and installations, yet my descriptions of Turrell's installations is highly illuminated colour projections. I include Turrell's installations to describe how my mind registers colour then light; first, colour, then light. I see highly illuminated colour yet, when subjecting others to my question, *'are Turrell's works predominantly about light or colour?* Responses, without exception, point to 'light'. Without exception, therefore, my response is different to those I questioned; I respond first to colour. Whereas when I acknowledge light, it is, however, secondary. I don't fail to see light, I simply register the installation as saturated colour enhanced through the use of light in varying intensities.

MONA's (Museum of Old and New Art in Hobart, Tasmania) permanent Turrell installation, in the newly constructed Pharos addition, facilitates our 'ritualistic engagement with light' (Valentish 2018). Enclosed in Turrell's light and colour infused egg in *Seen Unseen* Jenny Valentish describes the experience thus; 'To say it is profoundly beautiful would be an understatement. It feels like a gift' (Valentish 2018). The Turrell effect is super-sensory, sometimes fully penetrative. When travelling alone, a participant is paired with another, often a stranger. Once inside the egg, it seems bonds often form between two strangers previously unknown to one another. In the days following a psychedelic experience, users of LSD, or drugs delivering a similar experience, talk of an afterglow. Valentish questions if this is similar to bonds created between strangers as a direct

result of the *Seen Unseen* effect of enveloping colour and light. I see the experience, whereby the viewer participates in what is, I suggest, a psychological experiment, through penetrable colour and light and an embodying experience.

In the 1960s, prior to studying art, Turrell studied the psychology of perception, which he now applies to his art. Historically, Turrell claims, art is littered with paintings about light; Constable's and Turner's emotive landscapes, the Impressionists, and Holland's light-schools (Govan 2011:1-23). Turrell's interest in light and colour, or colour and light, is fused with psychology and perception. Turrell explains that mixing coloured light, unlike paint, delivers something different. Colour and light work differently to material colour; in paint for example, when blue paint and yellow paint are mixed, the result is green in varying hues from blue-green to yellow-green. However, if yellow light and blue light mix, the result is white light. Turrell explains this phenomenon through an interest in Euclidean and Riemannian geometries (Govan 2011).

In order to construct a Turrell experience, it is necessary to understand and apply Riemannian geometry where, in space, the curved line is the closest between two points and, it is necessary to go to this next level in mathematics to talk about seeing; to talk about light as a thing in itself; not simply light reflected off a surface, as it does in paintings. Turrell wanted to make something that **is** light rather than making something that is *about* light. Generally, light illuminates and reveals. Turrell manipulates light to obscure all but colour (Govan 2011). Turrell explains that light is physical; it is photons. He looks at light as a material exhibiting wave behaviour. Turrell adds that it was very important, to him, to accord light to 'thing-ness' (Turrell 2011). Another psychological effect of colour and light is manipulated by Turrell in *Double Vision* (2013). Here, Turrell deliberately creates a similar experience to 'Ganzfeld' – a German word describing the phenomenon of total loss of depth perception, or perceptual deprivation. The Ganzfeld installation slows visitors to the space to a standstill, forcing each to succumb to a different way of seeing.

(https://www.designisthis.com/blog/en/post/james-turrell-ganzfeld 2013) Full understanding of complex mathematics in Euclidean and Riemannian geometries and Ganzfeld is beyond the scope of this project however, I include this discussion in order to highlight the complexities of Turrell's installations. The level of mathematics required in the delivery of a Turrell experience is employed to create intensely illuminated and saturated colour which can be manipulated to affect a psychological experience of seeing and an altered state of consciousness.

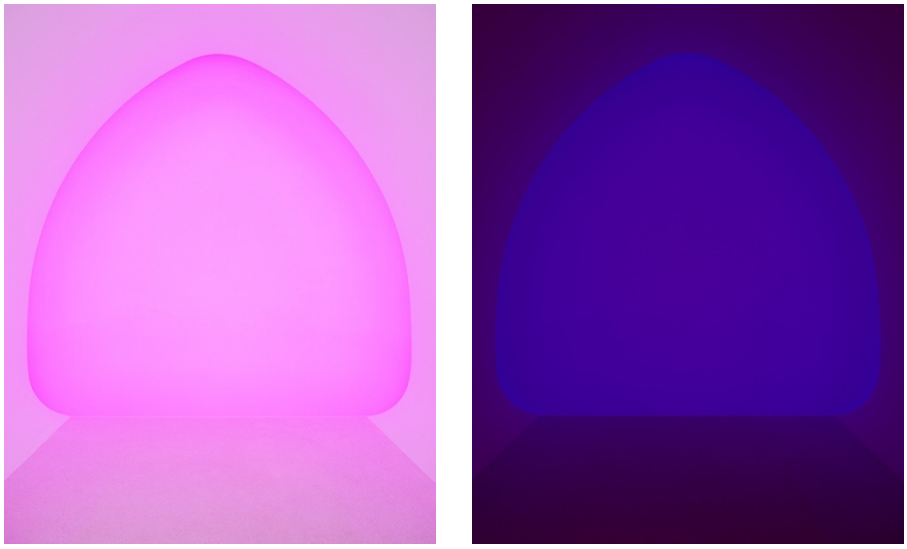

Figure 3: James Turrell, 2013, 'Double Vision', Ganzfeld, colour and light, dimensions variable

Turrell's psychology of colour and light implies what might be experienced through the use of particular mind-altering drugs. David Batchelor (2000:21) explores the connection of particular types of drugs with a perception of enhanced colour. The psychotropic stimulant Ecstasy delivers an effect to users which is said to enhance, intensify and, indeed, elevates the experience to a different level of consciousness. Writer, novelist, and philosopher, Aldous Huxley (1894-1963) (Huxley 1994:32), celebrated colour in his recollection of a personal experience during one entire afternoon while under the influence of mescaline. Mescaline is a naturally occurring psychedelic alkaloid obtained from a small spineless cactus called peyote or Lophophora williamsii. In *The Doors of Perception,* Huxley describes its effects as '… a slow dance of golden lights' and …

> Like the flowers . . . [the books] glowed, when I looked at them, with brighter colours, a profounder significance. Red books, like rubies; emerald books; books bound in white jade; books of agate, of aquamarine, of yellow topaz; lapis lazuli books whose colour was so intense, so intrinsically meaningful, that they seemed to be on the point of leaving the shelves to thrust themselves more insistently on my attention (Huxley 1994:32).

The flood of colour, Huxley claims, delivered a sense of 'seeing rather than seeing-as', describing the experience as 'seeing as-if-for-the-first-time', and 'effectively raising all colours to a higher level' (Huxley 1994:32).

Batchelor tells us that colour has its own power source, that colour means something different to each of us. He claims that colour moves forward, advances, looks at you, disturbs, and threatens to explode in your face (Batchelor 2000:97). Roland Barthes (1980) similarly describes colour as a type of bliss and ecstasy, which Batchelor claims is an overt eroticism of colour that turns chromophobia into its antithesis, 'chromophilia' (Batchelor 2000: 97). By this measure, my use of colour is no out-of-the-ordinary experience, nor is it artificially heightened by any means. I use colour practically and retrospectively in combination with patterning as it was used as an effective study tool that has consequently stayed with me and that I use as a way to make sense of what confounds me. Colour codifies, is an organiser, arranger, is ordering, and structuring. My relationship with colour might describe me as pragmatically chromophilic.

Insomuch as colour is an important contributor in my life and to my creative process, it is important to reflect on the reasons why colour is not always appreciated. David Batchelor (2000:21) informs us, this is not always so. Chromophobia is an extreme or intense dislike of colour. Batchelor alleges colour has been systemically marginalised, reviled, diminished, and degraded; that generations of philosophers, artists, art historians, and cultural theorists maintained a nurtured prejudice. Chromophobia, Batchelor claims, masks a fear of corruption through colour combined with attempts to purge

colour from culture with the aim of diminishing its significance and to deny its complexity. Also, Batchelor asserts there were some whom believed colour is the property of some evil body – usually a feminine body, a primitive, vulgar, queer body. Colour has been relegated to the realms of the superficial, supplementary, the inessential, or cosmetic (Batchelor, 2000:22).

Whereas I celebrate colour and welcome its use, there are those who obliterate colour from their lives. In a description of the all-white house of an (unnamed) art collector, to which he was invited, that housed only white/grey art, Batchelor (2000:9) claims he was reminded of the classical Greek body sculptures; headless, armless, legless, branchless trunks exhibiting uncanny similarities to the art collector's minimalist interior: closed off to the world and free from protuberances that might branch off its sheer whiteness to remain hidden – its everyday life remaining concealed and impenetrable. Batchelor questions if the empty white space is a model, much like the ideal neo-classicist body, for how a body ought to be; free from what we might call abject, sealed and enclosed in its ideal self; the ideal body free from flesh or anything that might smell, or a model of what the internal body should be; free from fluids, organs and viscera, a vacant hollow cleared of anything evidencing an actual life.

In support, Wassily Kandinsky's description of white is poetic; 'White is a symbol of the world from which all colour has disappeared. The world is too far above for its harmony to touch our souls' (Kandinsky 2008). Kandinsky continues, describing white as 'silence with great possibilities, like an impenetrable wall that shrouds its life from our understanding; white possesses a harmony of silence' (Kandinsky 2008). By contrast, black assumes a totally dead silence; a silence with no possibilities. In my world, colour contains not the totally dead silence of black nor white's silence of great possibilities rather, a world filled with great possibilities and the many efficiencies colour can deliver. Colour can be used as a practical and efficient coding systems, as a means to identify individuals and processes in vast organisations such as health systems. In the pathology laboratory, colour identifies human material types in addition to its sources in preparation for

dissection, microscopic analysis, or culturing. Colour, in combination with patterning and in repetition delivers structure to my world when I am confounded by an influx of information. Patterning adds another dimension to my world of ordering. My mind adjusts, resorting to what I am unable to describe. My best attempt is coloured ladders of value. The value is coded along the ladder that I use in, for example, mental arithmetic where I see the problem in its coloured and patterned order of value.

I use the term pattern broadly; I define ‘pattern’ and ‘patterning’ in several ways, used loosely to describe a regular form, order, or arrangement, or a random combination of shapes and colours in systematic sequencing as one would expect to see in the art of the Middle East and North Africa. An accepted definition of pattern is an underlying structure or organisation often described as a repeating unit of shapes and forms (Merriam-Webster 2017b). My project’s artefacts most closely reference vague formations of shapes in colour and repetition, gleaned from observations,

My use of the term patterning reveals logical engagements within the human organism within the scope of arrangement, replication, structure, and cyclical repetition of systems and processes. In other applications, pattern can be thought of as a skeleton of organisation holding together individual parts of a composition; a grid foundation holding together structures in patterned formation. This can be seen in commercial building structures where grid formations of steel girders form patterns that hold the structure together. I see connections in classes of pattern observed everywhere in nature, from the microscopic to the macro, and in made images. My imaginative organism is enmeshed with traces of biological science in an expression that is both reality-based and speculative; constructs of materiality informed by fluid processes of replication and connection. Poiesis, in the self-replicative actions of autopoiesis, determines patterns significant to specific types of human tissue. In this expression, visual descriptions of human anatomical and biological processes can be difficult when separating poiesis, pattern, fluidity, and porosity. Patterning responds to poiesis in its formation,

replication responds to fluidity, while fluidity relies on porosity, allowing replication to occur.

Poiesis is derived from the ancient Greek term meaning ‘to make’. Poiesis is used as a combining form meaning making and formation (Dictionary 2010). Porosity of human matter allows solutes to enter and exit cells and tissues by way of porous membranous boundaries assisting also the entry and exit of ‘other’ entities. I include here the ordinariness of commonplace viruses and bacteria and a higher order of invasive flora, parasites, and medical fungi, the likes of which I contrarily describe as simultaneously beautiful, bizarre, diabolical, and unthinkable. Beauty is in their exquisite structure; bizarre describes their trans-corporeality with the entire human system; diabolical is the effects on the human system; unthinkable is simply my sense of denial on discovering the ‘other’. Poiesis is the ongoing process of organisation that produces distinct repetitious patterning and order.

Within the scope of this project, autopoiesis in biological organisms refers to self-organisation and self-regulating pattern-forming systems of growth, metabolism, responsive, and adaptation. In biological science, the laws of thermodynamics are important unifying principles governing the chemical processes responsible for metabolism in organisms (Weinhold 2006). Biological thermodynamics is integral to internal biochemical dynamics in the production of energy, protein stability, DNA building, membrane diffusion, enzyme kinetics, and other essential energy-controlled pathways. Each process of autopoietic replication produces an identifying pattern. Weinhold (2006) tells us, it is when energy changes from one form to another, with a prevailing entropy or disorder, that a proliferative physiological process is initiated creating a reparative phase usually detectable in the blood; disordered pattern manifests in the organism as illness and disease until autopoietic uniformity reinstates homeostatic equilibrium. This is, Frost (2011:69-83) explains, to conceive of bodily material as having a distinctive and peculiar type of agency.

My project strives to produce perceptions of materials floating and flowing in repetition, and in cyclical movement that is achieved through layering of transparent colour in abstracted shapes that aims for a notion of porosity in fragile membranous borders. The human organism is not static or passive; cyclical movement or motion in catalytic homeostatic processes occurs each millisecond within human systems. Similarly, Derek H Whitehead, in 'Poiesis and Art-Making: A Way of Letting-Be' (2003:1), argues a poietic dynamic exists in the creative process. Whitehead questions the relation between poiesis and the sensory embodiments of art-making, highlighting the presence of a *poietic* dynamic in the activities of art practice from perspectives of painting, poetry, and music. In my research project, I have found a specific grounding to these questions in attempting to create the perception of movement in a static image through the relationship between layers of colour and pattern.

We see within the human organism a dynamic, flowing relationship between stasis and growth. Philip Ball (2009:3) explains how forms of meander patterning that surround us relate to the idea of flow built on the repetition of an undulating line in patterns of branching in the plant world, in river deltas and crystalline formations. In his book, *On Growth and Form* (1961:136), D'Arcy Thompson describes that depositions of inorganic material in the living body in the form of calcium salts or silica begin with the appearance of small isolated particles whose shape and form bears little relation to the structure of the organism but culminates in complex skeletal systems – and to other, non-human structures such as the skeletons of corals, molluscan shells, and simple organisms like diatoms and sponges. The form of skeletal elements depends on its chemical nature. This may be purely crystalline or the inorganic material laid down in conformity with the shapes assumed by cells, tissues, and organs; moulded to diverse forms within the living organism (Thompson 1961).

All fluids and substances are categorised as either organic or inorganic. Ian Hunt (2000:134) explains; when organic material ceases to exist as part of a living structure, it enters a state of limbo that is difficult to define. Hunt

describes an ossuary where, in medieval times, neatly stacked femurs formed walls and human skulls lay in formation; touched so often on the brow by visitors that a hard-polished surface developed resembling tooth enamel. Hunt questions the idea that we carry a mineral burden, coded by our DNA to conform to bone shapes and without which our bones would lack the rigid structure required to keep us upright and to protect internal organs (Hunt 2000:134). Shapes formed inside the body create soft cavities and crevices. Flow supports colonisation where porosity in the symbiotic human ecology plays host to non-human 'other' such as bacteria and viruses.

At the microscopic level, Hunt scrutinises the classifications of organisms such as viruses, which are not living entities but fragments of nucleic acid wrapped in a protein coat. Such entities possess the ability to replicate using parts of living cells in a parasitic relationship. Despite the ability to replicate, their chemistry renders them organic but without independent life. Viruses lack the structure of a cell; absent are membrane, cytoplasm, organelles, and a nucleus; but, asks Hunt, are they alive? Viruses have some semblance of life, so substantial in its effectiveness, Hunt claims '. . . it is difficult to classify them as non-living' (2000:135). These appear to be grey areas in scientific definition; our language and imaginations fail to respect the boundaries laid down by organic and inorganic, animate and inanimate, projecting instead blurred boundaries between the two (Hunt 2000:135). It is becoming increasingly evident the degrees to which non-human entities impact an individual's health and wellbeing.

Gut flora is the complex community of non-human micro-organisms inhabiting the digestive tracts of all animals. I have become increasingly aware, and health professionals now tell us, the quality of an individual's gut bacteria, its biome, determines the overall health of its host. I sense that healthcare will one day be individualised, dependant on the quality of gut bacteria and treated, perhaps, with administered prebiotics and probiotics; assisted in porosity and fluidity, evidenced in the dynamic nature of human systems that I reflect in my creative output using transparent colour in repetitive, layered patterning.

In the studio, I rely on applications of media and process to express the instability between inherently formal aspects of patterning and loosely arranged abstracted shapes in a form of hybridised patterning. When information is organised systematically, the human need to order elements into unifying forms is satisfied and gives ‘form to the formless’ (Bloomer 2000:38). For this reason, humans integrate pattern in forms of visual annotation into everyday use, unconsciously creating visual systems out of necessity. The process provides order and allows the human mind to imagine alternative realities in material forms that provides clarity to life’s disordered complexities. I assign the term linearity to my ladder of logic, to my colourful patterned flow-chart, when complexity confounds me, my mind delivers a type of form that, in my mind, is formless so that comprehension is allowed to flow.

Section Two: the residency – into the laboratory

In *Section Two*, I relate my experience in the pathology laboratory residency; why I chose to do it, how laboratory observation advanced my project, and how I exploit the gathered visual data to advantage my research project. I consider the scientific complexities of bacterial communication (chemotaxis) in an extended thesis of art focusing on one bacterium's process of chemotaxis. I explore diverse forms of bodily image art and theory, including the theory of Gestalt in addition to art that alludes to biology's cellular and molecular activity. I question interesting but sensitive questions of death and loss in addition to stark combinations of feminist themes of biology including the abjectionable and the beautiful.

In *Porous Bodies and Trans-Corporeality in Bodily Natures: Science, Environment, and the Material Self* (2012), Alaimo claims all entities are characterised by porosity. Porosity allows the outer world to seep and flow in intimate relationships. Porosity is a measure of the void, the empty spaces of things, used in this paper in terms of human biological matter. Human cells are largely composed of micro-organisms; each of us is a jungle ecosystem, a multiplicity of multiplicities, compared not to qualities of impenetrability but to those of a sponge (Alaimo 2012). In this sense, the human organism is composed largely of voids to where micro-organisms migrate and colonise.

Trans-corporeality reveals itself within interchanges, connections, and seepages across various bodily systems and colonisation of the 'other' within the human system. Movement across human corporeality and non-human nature necessitates rich complex modes of analysis that travel through what Alaimo describes as the natural, cultural, biological, textual territories of material and discursive entanglement (Alaimo, S, Hekman, S., 2008:3). As a theoretical site, trans-corporeality is a place where corporeal and environmental theories productively mingle: the human is always enmeshed with the more than human world (Alaimo 2012). I am increasingly aware that the natural world pervades the human organism that I reflect in my studio

process that embraces the porous qualities of viscera and fragile membranes. Nature is closer than one's skin and, indeed, to think across bodies reinforces recognition of environments and eco-systems outside and inside the human organism; notions reinforcing my observations in diagnostic processes in a clinical environment.

These observations were carried out during my arts residency in Launceston General Hospital's Pathology Department. During the term of the residency, the scientists demonstrated unexpected interest, questioning the 'why' and the 'how'; why I would be, or 'why would I be' interested in microscopic human matter, and how I would present my findings. The experience delivered depth and new layers to the project, at the same time both broadening and grounding my research in the porous qualities of human material, biological processes, the precarious nature of homeostasis, in addition to how and why colour is used in screening procedures to reveal microscopic patterning in clinical results. The residency provided unique and absorbing opportunities to gather substantive visual data, whet my creative appetite, focus my thoughts, while determining the course of prospective future research. The project now has a multi-layered rationale to include not only human anatomy and processes of biology but the effective nature of invasive entities on the porous and fragile human system.

It was evident to me, when starting my residency, that 'pathology' is the coal-face of diagnostics. The term pathology is commonly defined as the science of the cause and effect of diseases; pathological features considered collectively or the dominant pathology that determines a pathological condition. Pathology studies the essential nature of diseases in addition to the structural and functional changes produced by them; the anatomical and physiological deviations from normal or healthy (Merriam-Webster 2017a). Forensic pathology describes work done by scientists whom examine and provide substantive evidence suitable for use in a court of law in, for example, a murder, coronial enquiry into a traffic accident, a result of which someone has died. In addition, pathology is defined as a treatise on or a compilation of abnormalities that refers to non-human forensics. For example, a pathology

of forensic accounting which is the microscopic examination of financial accounts (FCPAS 2017). In a social sense, social scientists, critics, and political activists refer often to social pathology in perceptions of societal and human social needs. The term ‘pathology’ points to scrutiny of all things human (and non-human), of humanity, its social, political actions and interactions.

Included in the suite of individual laboratories in the Pathology Department is a unit of scientists that investigates the ecology and the ‘other’ within the human organism. These non-human others include mould-forming and bacterial entities. I have identified a number of artists whose practices delve into and deliver art depicting both actual bacterial forms and conceptual representations. From a broad range of artists, I selected those whose work or concept supports and informs my conceptualisation of the human organism and its trans-corporeal and abject qualities. I considered material and media, and how the work resonates with my concept of medical interventions and our failing bodies, placing emphasis also on feminist representations and the materiality of the human organism. In particular, Anna Dumitriu delivers interesting results from experiments in collaboration with scientists using bacteria.

Philip Ball (2009:131) describes discoveries by a collaborative team led by Eshel Ben-Jacobs in 1994 that revealed how bacteria grow into complex patterns. Many bacteria branch-off, while others display curling tips resembling plant-like structures. Several, on close inspection, contain patterns of rotating vortices. Ball points to the presence of sensing chemicals that diffuse into the environment as a way to communicate with another same-species bacterium. A bacterium moves toward larger concentrations of chemical signals in a type of behaviour called ‘chemotaxis’. Similarly, higher animals respond to chemical signals guided by hormones called pheromones. The impulse to move and congregate is not always chemical; some organisms flow toward sources of light or heat (Ball 2009:131). The principle is the same, however, an organism moves in a direction purposefully, in order to improve its circumstances; toward warmth or its

fellows. Artist Anna Dumitriu deploys a bacterium's sensing chemical in a vibrant body of work demonstrating how a bacterium colonises through signalling processes in order to communicate with its fellows.

Dumitriu's work fuses sculpture and bioscience with a focus on bioinformatics. In *Communicating Bacteria* (2009), Dumitriu combines historical textiles and stitching techniques with three-dimensional mapped video projections to explore current research in the field of bacterial communication. The artist engages a wide audience interested in biotechnology with the aim of increasing debate and understanding of bacterial communication, called chemotaxis, as a new form of infection control.

Bacteria possess intricate systems of communication, for example quorum sensing and voting on issues affecting growth and survival of its colony and to signal the presence of another bacterium. Dumitriu explores this as a form of social intelligence; that these simple life-forms work collectively using gathered information in meaningful ways to protect the colony. Dumitriu combines antique white-wear garments and the bacterium Chromobacterium violaceum. Chromobacterium is Gram-negative rod-shaped bacteria. At least two species within the genus are known; Chromobacterium violaceum and Chromobacterium subtsugae. Chromobacterium is a rare entity that typically begins life as a skin infection or lymphadenitis after contact with stagnant water or soil. The organism produces a natural antibiotic called violaceum (violet non-diffusible pigment) which is said might be useful in the treatment of colon and other cancers. When introduced into the human body via a wound to the skin, and from subsequent contact with stagnant water or soil, the entity may progress to fulminating septicaemia metastatic lesions and multiple abscesses in bodily organs, lymph nodes and the brain resulting in multi-organ failure (Kumar 2012). Dumitriu inoculates antique white-wear garments with CV026, a genetically modified Chromobacterium violaceum. (Figure 3)

Figure 3: Anna Dumitriu, *Communicating Bacteria*, 2009, antique white-wear textiles inoculated with Chromobacterium violaceum

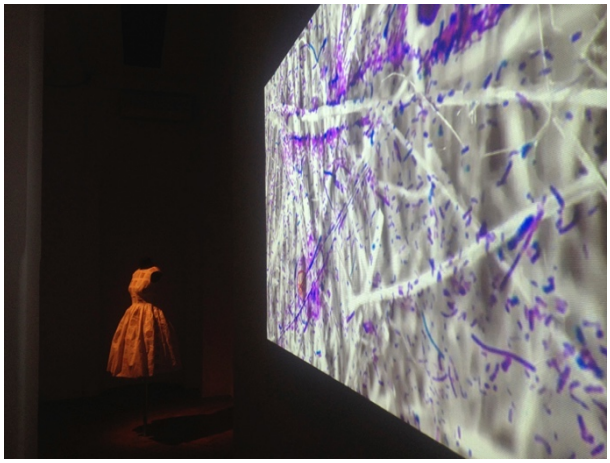

Figure 4: Anna Dumitriu, 2009, *Communicating Bacteria*, 2009, antique white-wear textiles inoculated with Chromobacterium violaceum, video projection view

The fabric's fibres and fine stitching absorb CV026 which is then exposed to the un-modified Chromobacterium violaceum, at which time the release of Homoserine Lactones triggers communication. Homoserine Lactone (*N*-Acyl) is a class of signalling molecule involved in bacterial quorum sensing that is delivering useful developments in bioinformatics (Churchill 2012). The communication signal travels across the fabric turning the white bacterium violet or purple. Using time-lapse photography and video, the process is filmed for projection across the entire installation, (Figure 4). Dumitriu's art, combining beautiful and fragile antique white-wear with a dangerous bacterium, emphasises the usefulness and possible life-saving properties of bacteria; entities that might be considered abject.

Similarly, Helen Chadwick's (1953-1996) art combines the abject and the beautiful. As the title suggests, Chadwick's works, *Wreath's to Pleasure* (Miller 2012), are circular in form, closely resembling funerary wreaths. Chadwick's wreaths fuse noxious fluids and abject substances with the beauty of blossoms; orchids floating in a sea of pink window cleaner framed with a membranous lining of lime marmalade; a plum sitting inside a circular pool of engine oil mimics the nucleus within a garland of tulips; delicate flowers suspended in compositions formed of a mix of toxic substances and abjectionable materials. The works suggest transient states poised between life and death. (Figure 5) Chadwick's photographs, taken from above, evoke a sense of looking down on cellular bodies (Miller 2012). Images resemble biological organisms, gestation; looking through the lens of a microscope, an analysis of organic matter.

Figure 5: Helen Chadwick, untitled from *Wreaths to Pleasure* exhibition, the Henry Moore Institute, 1993-95, a single plum, engine oil, tulips, dimensions unknown

Chadwick refers to the wreaths as 'bad blooms' (Miller 2012), that are simultaneously seductive and repellent. An audience is confronted with visions suggesting the ecology of bodily interiors where luminous colour is imbued with the abject; flowers offset by the unpleasant nature of visceral stickiness. I draw parallels with Chadwick's presentations in suggestions of

seeing through the lens of a microscope in my project's reference to microscopic biopsies, porous viscera, blood, trans-corporeal abjection, and the human ability to share its interior with other entities. I highlight the human organism's fragility; Chadwick's wreaths suggest re-generation, the cycle of birth and death, growth and decay, transience and temporality. I relate this work to the, often, abject nature of my research when gathering visual data from the pathology laboratory. In addition, there is something 'human' about the circle that alludes to cellular and molecular activity. The circle represents a complete cycle; of birth, life, death and, in turn, life again. The circle is a continuum; there is no beginning or end. The circle references the fluid constellation of human minutiae at the cellular level and, perhaps, the abjection of other entities.

Body art: my personal biome

In observations of bodily functions, diagnostic analysis of blood, and microscopic visual data, the aesthetically beautiful, delicate, yet abject nature of bacteria captured my imagination – its colourful florets and microscopic detail in reef-like formations. My findings prompted an inquiry into growing my own personal biome in DIY experiments with nutrient agar with the intention to capture innocuous strains of bacteria present on the surface of my body. The fleeting experiments produced interesting results in fascinating patterns.

Figure 6: Sue Quinn, assorted bacteria cultures embedded in resin, 2017, petri dish, nutrient agar, bacteria, pigment, resin

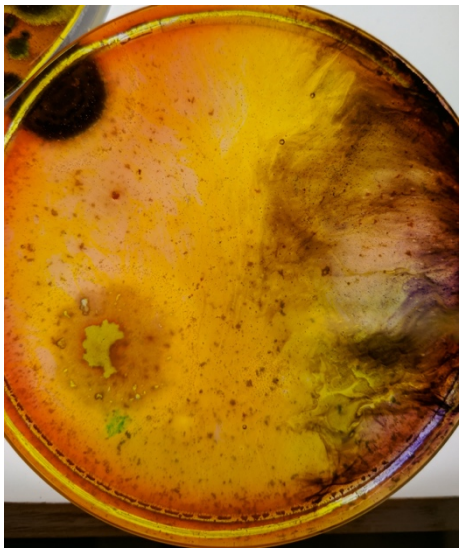

Figure 7: Sue Quinn, 2017, single bacterium growth, petri dish, resin

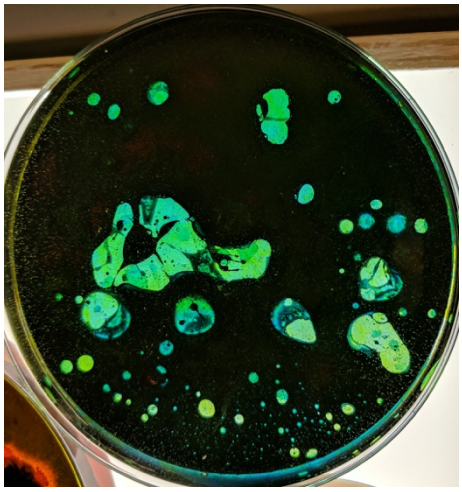

Figure 8: Sue Quinn, 2017, single bacterium growth, petri dish, pigment, resin

Growing bacteria can be daunting to the non-scientific psyche. The prospect of intriguing patterns of growth, nevertheless, outweighed fears of contamination from what grew in my over-active mind to become trifid-like in cultures creating something monstrous. Sourcing ready-made nutrient agar, used in laboratories as a growth promoter, proved untimely. In response, I cooked a home-made recipe containing a precise mixture of gelatine, water, sugar, and chicken stock. The mix is boiled in a microwave for several minutes, poured into petri dishes then allowed to cool under refrigeration. I sourced bacteria from under my finger nails, my face, behind my ears, and

other places on the body where Q Tips might find relatively innocuous bacteria.

I used petri dishes both with and without lids; dishes without lids produced the most interesting and captivating results, openly gathering whatever might float past to land in the agar, adding to bacteria gathered from my body. Where porosity and the relatively fluid matrix of agar allowed movement of each bacterium, what appeared to be a jostle for positioning, growth, and boundaries produced colourful textures and patterns in interesting juxta-positioning. Petri dishes with lids produced aesthetically pleasing but relatively small and less interesting results in single bacterium growth. I say less interesting compared with dishes containing multi-bacterial growth; my judgement is entirely aesthetic. Single bacterium growth possesses its own beauty in delicate patterns uncontaminated by another bacterium.

Figure 9: Sue Quinn, 2017, Multi-bacterial growth, petri dish, pigment, resin

When I achieved a satisfactory level of growth, I added layers of clear resin as an embedding agent and to conserve colours and patterns which, I understand, might otherwise deteriorate. A single bacterium, I discovered, is hostile to other strains hence definitive borders and boundaries formed around growth colonies of each bacterium. Beneath the layer of resin, several layers of bacteria can be observed; many demonstrating swift growth in large florets, others demonstrating slower growth producing delicate hyphae. Combinations of bacteria inside the lids-off dishes produced colourful and

interesting reef-like ecosystems, resembling also mosses and lichens that proliferate on rock surfaces. My home-grown bacteria satisfied a degree of curiosity however, static images in petri dishes failed to deliver any sense or notions of movement, seepage, and flow which are key to the project.

Figure 10: Sue Quinn, 2017, Multi-bacterial growth in resin, petri dish, pigment, manipulated in monochrome

In Figure 10, the image is manipulated in Photoshop using a monochrome filter. I include it here as an example of an experiment I conducted in order to detail the growth and form of the bacteria rather than focusing on colour. I did not repeat the process. I abandoned experiments with bacteria to concentrate, rather, on methods producing multi-layered models in addition to researching how other artists, such as Dumitriu, encourage bacterial growth, mimic bacteria, and experiment with organisms in the studio.

It is because entities are characterised by ontological intimacy with a host of other entities in the world that they not only thrive but are free to flow, to influence, modify, and colonise. Alaimo (2012) questions how we understand the agency and significance of material forces given their interface with and pervasive effects on the human organism. We tend to think of the skin, the organism's largest organ, as a barrier to the exterior world. It is assumed the skin protects the body's internal landscape from its external environmental and from foreign entities. Entities (and substances) possess the ability to penetrate the organism's outer, porous barrier by the very nature of their physical dimensions and molecular size.

Using the descriptor ‘Cellules’ (2012), Mona Hatoum’s installation of steel cages (cells) (Figure 11) and blown glass registers a double meaning; the first is the smallest unit of biological life; the second is a man-made structure of limited and limiting space symbolising restriction of movement, oppression, suppression of human rights, entrapment, and indifference to basic social needs.

Figure 11: Mona Hatoum, Cells, installation view, 2012-13, steel cages & blown glass, dimensions variable

Hatoum’s ‘beings’ are blown glass representing fragility and the vulnerability of the human organism, contrasting with the strong metal cages holding the fragile glass structures in a juxtaposition of the organic and the man-made; freedom from oppression; individualism versus institutional force. Hatoum’s aesthetic is conditioned by surrealism using biology as a reference point in work that usually contains duality of purpose; fragility of the human organism imbued with psychological and political meaning. Hatoum draws inspiration from personal experience as a double exile, forced into statelessness during what she intended as a trip to London where she was forced to stay after war broke out in her home state of Lebanon.

This personal narrative is naturally imbued in Hatoum’s work with themes of displacement and powerlessness; evidenced also in the narrative of feminism. Hatoum’s aim, in many of her works, is to highlight psychological entrapment, that the audience is somehow implicated in the work. Surveillance by an unknown and faceless figure of authority is represented in

Corps e'stranger, (Figure 12) where video and still image projections of endoscopic probing points directly to both voyeurism and surveillance.

Figure 12: Mona Hatoum, *Corps e'strange (strange or foreign body),* 1994, probes, projections, dimensions variable

Hatoum uses endoscopic and colonoscopy cameras to explore the outside and penetrate the inside of her body. The body (self) (Jones 2006:42) is turned inside out, engaged and projected, while an echograph captures the sounds of her breathing and her heartbeat. Wet, sucking, pulsating tubes and orifices project across the floor of a circular installation. Hatoum highlights the invasive quality of medical technology in graphic displays of the ultimate violation of the human body and so, producing an environment that is both claustrophobic and sensuous. A viewer is '. . . plunged into Hatoum's body rather than engaged from the outside' (Jones 2006:43). Art theorist, Amelia Jones makes the point that *Corps e'stranger* turns the normative, objectifying 'male gaze' of feminist theory inside out; that for women, the desire to present as 'coherent containers' in a chosen identity is thwarted through identification and the mucoid organic tunnels beneath their feet. Sucking and beating sounds plunge a viewer, deeply, into the chasm of embodiment (Jones 2006:42).

In response to art and the human body, Jones writes, '. . . body art practices solicit rather than distance the spectator, drawing her or him into the work of art as an intersubjective exchange' (2006:12). Hatoum's art is socio-political

from a feminist perspective, advocating freedom from oppression for all women. My reference to Hatoum is the artist's use of the human body's anatomy and to abjection that frames political intent relative to women in addition to Hatoum's use of the circular referent. Hatoum claims a presence for biology's smallest unit of life – the cell, and the atom, the most basic unit of matter. This distinctive kind of agency is not a direct nor an incidental outgrowth of human intentionality but rather one with its own impetus and trajectory (Frost 2011:69-83). In David Peat's 'The Alchemy of Creativity: Art Consciousness and Embodiment' (Peat 2012) the assertion is made that art provides clues to sentience, or to the way consciousness is embedded within the physicality of the material body.

Expanding on Peat's concept are suggestions that sensibilities about consciousness of the entire organism appear to be considerably more highly developed in artists' claiming that art and music make manifest by bringing into consciousness awareness all that previously had been felt only tentatively (Leder 1990). Drew Leder in *The Absent Body* (Leder 1990:28), argues that the body plays a central role in shaping experience. Leder questions why we are frequently oblivious to our own bodies, continuing to note, while perception is formed through sense organs, the individual does not taste its taste buds, smell its nasal tissue, nor does it hear its ears. Leder call this focal disappearance of the specific bodily organs and activities of perception the 'Ecstatic Body' (1990:26).

In response to notions of unseen bodily functions, Grosz's (1994:79) *Volatile Bodies: Towards a Corporeal Feminism*, proposes that the limits and boundaries of the body are not fixed and confined to its anatomical container – the skin. The body, and its image, is dynamic and fluid with osmotic borders and contours. The body's osmotic exchanges incorporate and expel, outside to inside and inside to outside, in ongoing exchanges. Grosz questions also the possibilities of diverse forms of body image disintegration or reorganisation that occurs when the image of a body is identified in bits-and-pieces; the reconstruction of the fragmented body through its diverse and scattered experience, and by compartmentalised sensations through which

experience is serialised, momentary and fleeting and free from any ongoing unity (Grosz 1994b:63). Understanding how the mind and body work in tandem in historical knowledge of what has been witnessed delivers clues to what we are seeing.

Mind and body contain different properties; the mind is a material object containing properties stressed in Gestalt psychology; the term meaning 'unified whole', referring to theories of visual perception developed in the 1920s in opposition to the classicist atomistic models of British empiricists. Gestalt theory describes how visual elements are organised into groups or unified wholes when certain principles are applied; described by Cohen and Griggs (Cohen 1980:404-412) in principles of *similarity*, *continuation*, *closure*, and *proximity*. Similarity applies when objects look like one another and perceived as a group or pattern providing unity. Continuation occurs when the eye is compelled to move through one object and continues to another. The viewer's eye will naturally follow a line or a curve leading to the next object. Closure occurs when enough of the shape of the object is perceived by filling in the missing information. When elements are placed close enough together to be perceived as a whole, proximity occurs (Cohen 1980). I aim for closure when speculative visual descriptions of human material are viewed in magnification forcing the mind to fill in missing information; that the entire image is made clear in a perception of seepage and layering.

Artists convey perceptions of the body in distorted images that demonstrates the brain's holistic processing ability based on the Gestalt theory. By enlisting light to illuminate layers of transparent colour, my models of biology invoke a sense of depth, tricking the mind into believing movement is occurring; as if each layer might be depositing material to its neighbour. I attempt to exploit the mind's ability to recognise patterning which is a basic function of the perceptual system where specialised brain regions involved in detecting patterns of movement renders the brain highly sensitive to cues of motion. The effect can be seen in paintings in subtle ways by blurring either the background or the object or stretching along the axis of movement. Melcher and Bacci (2008:347-362) state that recent research suggests the perception

of motion in a static image is not necessarily metaphysical. It is now accepted that static images portraying motion in fact stimulates brain regions involved in perceiving real motion, not simply a detached understanding of motion based on logical reasoning (Melcher 2008). By engaging subtle head movements and a change in the position of the eyes, each layer in my artefacts appears to shift in relation to its neighbour, bringing about a changed perspective, a new order.

Justine Cooper creates a new bodily order in *RAPT II* (Donohue 2005), effectively dismantling then reconstructing her own body in a series of scan slides after subjecting herself to six hours of Magnetic Resonance Imaging (MRI). The installation is clearly a human body indeed, it is Cooper's body (Figure 13). However, distances between slides increases the overall dimensions of the body. Cooper removes the body's outer wrapping, exposing what lies below the surface in seventy-six scan slides producing a new bodily order measuring 7.2 metres in length. It takes perception in Gestalt theory to recognise that it is in fact a human body, and not simply a blurred and unrecognisable image

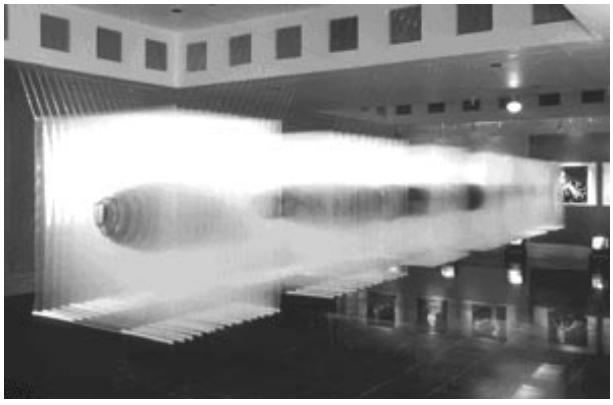

Figure 13: Justine Cooper, *Probe 600* from *RAPT II*, installation view, 1998, 76 MRI scan slides, architectural film, 720 cm long

Cooper's MRI constructed body questions how readily living flesh is transformed into malleable data and that medical specialists gain instant access, from all angles, to the body's interior anatomy (Sparks 2009:13). Cooper stretches the body, rendered in two-dimensional images as a three-dimensional object, through strategic spacing. This work thus explores the

unseen, the ethereal, an unknown realm, in addition to how humans interact with medical technology in a fantastic vision of moving through and beyond physicality using the transparency of MRI scans. Cooper's work moves from the specifics of an identifiable body to raise core concerns that characterise her practice; questions of life, death, and our failing bodies.

Figure 14: Justine Cooper, *Cell*, installation view, 1992, film of plexiglass

An earlier body of work from Cooper, titled *Cell* (1992), produced in response to the artist's first use of medical and scientific imaging, is composed of high magnification images in a cubicle-like structure designed to replicate a human cell (Figure 14). Cooper's intention is '. . . to widen the sliver and broaden our view of our own bodies' (Sparks 2009:8). Cooper's *Cell* installation exploits transparency and light to deliver the illusion of fluid matter; a suggestion that the human organism is in a constant state of flux and renewal.

In terms of observation of the biology of the human organism and the nature of material for processing, the pathology residency experience proved both confronting and informative. I surveyed five laboratories, one week in each, beginning in cytology, which is the scientific study of cells, their formation, structure, and function. In hospital pathology, cytology is the medical specialty diagnosing diseases and conditions through examination of human cellular tissue sampling. The cytology laboratory takes delivery of non-identifiable (coded) body parts for dissection and testing. I observed the dissection of parts of a gastro intestinal tract, as well as tumours, cysts, umbilical cords, ovaries, a uterus, epididymis', placenta, gall-bladders, and

ovarian tubes. I was unprepared for my deeply emotional response to a pre-term placenta measuring approximately five centimetres in length; exquisitely constructed, its internal working visible through its transparent membrane. It was impossible not to imagine the foetus; it is often what is unseen that most profoundly affects us. I watched preparation of a placenta for karyotyping by medical scientists that detects and determines chromosomal changes or abnormalities that might result in syndromes such as Trisomy, better known as Down Syndrome.

Whereas cytology might be confronting, biochemistry is less so in the study of chemical substances and vital processes that occur in living organisms; the study of the chemistry behind biological processes and the synthesis of biologically active molecules. Haematology is the study and treatment of blood-related disorders and blood components, including bone-marrow cells. Haematologists study diseases of the blood; anaemia, infection, blood-clotting disorders, leukemia. Microbiology is the study of all living organisms; those too small to be visible to the naked eye; bacteria, viruses, fungi, protozoa and algae and collectively known as microbes. From an artist's perspective, the process of (cellular) frozen-sectioning provides a wealth of visual data, delivering an opportunity to demonstrate my use of colour repetition as a method of recall; conceptual human material captured in slivers of wax contained within coloured cassettes for storage (Figure 15). The use of coloured cassettes demonstrates a colour-coding system used in pathology. Each colour represents a specific laboratory from which the tissue or body part originates post examination.

Figure 15: Coloured cassettes used to store of human tissue samples

Figure 16: Coloured wax used to embed human tissue in frozen-section biopsy examination

In this oft gruesome place, I liken containers of coloured wax, shown in Figure 16, to containers of ice cream or gelato in the freezers of corner shops and ice cream parlours. Again, I turn to colour-coding as a simple and useful method for storage and recall. My engagement with colour in the pathology laboratory was both unexpected and rewarding, strengthening my concept of colour as both an orderly practice to recall complicated processes and a method of systematic coding. It is impossible to say however, if scientists share a similar relationship with colour with their coded method of storing microscopic material.

In terms of both gross and microscopic anatomy, observing procedures on body parts in cytology resonates with Grosz's (1994b:81) descriptions of the abject in relation to bodily fragments. Paul Schilder (Schilder 1978:81) suggests that whatever originates or emanates from or out of the body will forever remain a part of it, suggesting a period of mourning for a removed body part and a deep sense of loss. Grosz (1994b:81) describes separable bodily parts and substances as the abject and the detachable; objects that were once part of the body but are never distinct and completely separable from the body. Further, I relate here the empathy I felt in the laboratory when observing deliveries of lidded buckets, small, medium, and large, containing body parts for dissection and post-death examination. It is the role of art and artists to remind 'us' that knowledge can often only be gained at an emotional cost. Svenja Kratz is inspired by the shifting understanding of life and death in response to contemporary biotechnologies in the body of work, *Afterlife: Immortalisation of Kira and Rama*.

Kratz uses preserved items from the bodies of calves, Kira and Rama, including their hearts, hides, and bone fragments in a custom-made Egyptian inspired bioreactor containing living foetal calf cells and a lentiviral plasmid (bacterial DNA molecule containing viral vectors). The work questions the ethical ambiguities and challenges that accompany the manipulation of organisms. A focus is the use of Foetal Bovine Serum (FBS) in cell and tissue culture. FBS is a protein-rich serum derived from the blood of foetal calves and used as a nutrient supplement enabling cells in culture to survive. Kratz highlights the *victims* at every level of consumption placing the boundaries between harm and benefit in constant flux. The exhibit is a collaboration between SymbioticA Research Group, Kratz, Dusty Tame, and John Barnard (http://www.symbiotica.uwa.edu.au>exhibitions>visceral 2017).

Kratz combines installation art with science in experiments that inform in collaborative projects with scientists. SymbioticA brings science to the wider public using language and imagery that simplifies the complexities of experimental science while questioning also its assumptions and implications. I employ a nexus of art and science that demonstrates how art can deliver a

simple solution to both understanding and recall. Kratz carries out collaborative scientific experiments using biological material; my process is studio-based using fluid materials and colour to produce porous layered effects reflecting human biological processes.

Following my encounter with human cadavers, I questioned my sensitivity to the abject; the dead and dissected human body in its totality, its quarters and halves, noting how strangely unmoved I was when viewing harvested microscopic tissue parts. Does bodily material lose relevance when it is increasingly fragmented? This question is posed by Jones and Whitaker in *Speaking for the Dead: The Human Body in Biology and Medicine* (Jones, G, D., & Whitaker, Maja, I. 2009). Jones and Whitaker contend that what or how much is removed from a body appears to matter; not in terms of scientific enquiry rather, in emotional relevance. Removing a brain is worrisome to relatives of a deceased person however, removal of sebaceous gland material, a sliver of bone, or microscopic viscera appears to be emotionally less significant. Nevertheless, the remaining cadaver is a violated body (Jones, G, D., & Whitaker, Maja, I. 2009). In hindsight, the discomfort I felt throughout introductory sessions of wet-lab anatomy was purely emotional in response to the reality of death and to the spectacle of violated human bodies; whereas I felt nothing when viewing cellular material, or traces of matter through the lens of a microscope.

I relate from a position of experience that removal of bodily organs, indeed, does retain greater emotional and cultural significance since the cadaver is less complete than if the part removed is a microscopic sample of membranous lining from the mouth, the digestive tract, or other non-visible places within the body. I am a mother who lost a child as a result of severe injuries sustained in a motor vehicle accident. It has been disclosed to me, several years later, that my son's brain was removed in autopsy; retained for reasons that are not clear to me but that I accept as necessary in the execution of post-mortem coronial enquiry. My immediate emotional response was profound, raising the personal significance of a loved one at rest in an incomplete state. The immediate horror here, of course, far

outweighs my earlier discomfort in the presence of donated cadaver material, anonymous and unfamiliar; I had not witnessed nor engaged with their living state as complete and vital humans.

In this sense, Maurice Merleau-Ponty's (Merleau-Ponty 1962) concept of the phantom-limb phenomenon is highly relevant to unpacking the complex emotional and embodied responses to the incomplete and abject body. For Merleau-Ponty, the phantom limb is neither physical nor psychological, it both is and it isn't, existing as an ambivalent presence in our body schema. Grosz describes both phantom limb syndrome and general loss of bodily parts as 'narcissistic investment' (1994b:81). Grosz's 'narcissistic investment' label arises from Freud's description of narcissism, hypochondria, and neurasthenia (Grosz 1994b:81).

Freud speculated that those suffering illness or disease often become involved as their libido, withdrawing from the everyday to become invested only in the present situation of the ego. Freud's assessment of narcissism is applied also to hypochondria whereby the subject withdraws the libido from the external, investing only in whatever part of the body is diseased. It is here that Freud touches on psychosomatic phenomena and how the mind can produce perceptible bodily suffering in the absence of any medical condition. Furthermore, I link Freud's descriptions of narcissism and hypochondria to my feelings in the laboratory; this is to say, in addition to an increased sense of vulnerability to residues on surfaces, I felt empathy for others suffering loss.

Empathy is not overtly evident when clinical and scientific staff go about their daily business professionally and impersonally. My thoughts drift to Grosz and Merleau-Ponty and to those losing parts for diagnoses and to medical staff actuating processes and evaluating results. A a visual thinker, it is not only my overly active imagination that takes me to whomever lost those bodily parts housed, after, inside small white buckets and coloured cassettes. I am taken also to a reverently hushed surgical operating theatre where fabric-covered feet whisper across whiny sterile floors; faceless theatre staff

in fetching blue scrubs. Reality, I was informed by pathology staff, is more accurately described as a hum of activity, background music, barking instructions, and laughter; it is what these people do each day and, to them, it holds no reverence. This is not to say there is no empathy. Rather, the question must be how can this job be done each day if not impersonally; testing, scrutinising, diagnosing, in the knowledge that someone will be given bad news, sad news and, often, good news.

In the six weeks of the residency, my process-driven response was truly captured in the Microbiology area, including the laboratories investigating invasive flora and parasites, including discoveries made within exquisite, colourful, patterned cultures in petri dishes and on glass slides. The joys and delights found in floral discoveries tempered my first impressions of a distinct, indescribable and pervasive stench described to me as an *unpleasant mix of poo and autoclave*. Each day the autoclave destroys faecal and other samples of abject bodily material including the materials' plastic petri dish containers. Timing, too, is imperative hence, one learns quickly the importance of morning observations, when cultured specimens blossom overnight for next morning's scrutiny, when discoveries are made within the colourful flora of bacterial infections.

By looking past, or seeing beyond harvested material and bacterial infection, the abject, I was free to enjoy patterns and colours that I would use later in the studio. Nevertheless, I quickly adopted a hands-behind-the-back stance; whereby, despite stringent safety precautions applied in all laboratories, each horizontal surface poses a threat of contamination hence, hands clenched tightly behind the back became my adopted laboratory stance. Fear and panic find their way into the psyche when it is surrounded by or invited to handle a petri dish or a glass slide; likewise, locations of protective gloves and anti-bacterial hand wash became hardwired. Nonsensical breath-holding for extended periods helped control emergent paranoias of a fragile self.

I am an artist; I am not a scientist; I am somewhat afraid of what is not known to me of science, biology, and the abject. Julia Kristeva (Kristeva 1980),

characterised abjection thus; '. . . refuse and corpses *show me* what I permanently thrust aside in order to live'. Kristeva (1980:124) argues; wounds, blood, pus, and the sickly, acrid smell of sweat and decay, do not signify death rather, abjection in suggestions of death, or that death might be imminent. 'These bodily fluids, this defilement, this shit are what life withstands, hardly and with difficulty, on the part of death' (1980:124). Kristeva's analysis validates personal episodes of abjection and abject fear in the pathology residency. Abjection is an involuntary response. In each laboratory, however earnestly safety was impressed, there hovered around me a fear of the unknown, or the known that scared me, afraid to touch door handles and surfaces; mapped positions of hand-sanitiser pumps and protective gloves forever burnt into my memory.

Michelle Meagher (2003), in 'Jenny Saville and a Feminist Aesthetic of Disgust', characterises abjection and disgust in an analysis of Jenny Saville's paintings; contrasting Saville's representations of disgust in a suggestion that 'an aesthetic of disgust reveals the fundamental ambiguity of embodiment', and, 'disgust is a physical reaction, a reflex relatively unresponsive to the will' (Meagher 2003:23). Sensations of disgust, of abjection, are functions that protect the body from harm.

To Kristeva (1982), abjection is personal, a bodily experience, at once somatic and symbolic and, '. . . which is above all a revolt of the personal against an external menace from which one wants to keep oneself at a distance, but of which one has the impression that it is not only an external menace but that it may menace us form the inside' (Kristeva 1982:124). Kristeva proposes that abjection is the feeling of anxiety, a response to aversion, nausea, distraction to the horrible that threatens to dissolve the border, the boundaries, between self and the 'other' (1982:124). Abjection is personal; in the laboratories I witnessed scientists handle what I see as abject material and, often, without the protection of gloves. The nature of my abjection is specific; I am averse to bodily fluids – my own bodily fluids and that of others. Whereas I see tears as no more than salty water, tolerated, to be kissed away on the cheeks of children; saliva, urine, vomit, and mucous

are repellent to me. Once my body expels its fluids, they too become objectionable and abjectionable. Using a simple analogy, my preference would be to sustain a punch to the face than to have someone spit on me; saliva is, to me, the most abjectionable of the bodily fluids. My mind tells me saliva is not only that fluid manufactured by salivary glands within the mouth rather, it contains bacteria, stomach acid, phlegm from the throat and, I suspect, nasal fluid; all in a mix called saliva.

Robyn Longhurst (2001:29) talks of abjection, *our* abjection, our subjection of whatever it is we find abjectionable. Longhurst suggests that the fluid and volatile flesh of the body tends not to be discussed describing it as '. . . the runny, gaseous, flowing, watery nature of the body' (Longhurst 2001:30), and what is often overlooked, or fails to be acknowledged, is when a body breaks its boundaries; when it urinates, vomits, farts, bleeds, ejaculates, gives birth, or when it engulfs objects such as tampons, or sexual objects. Longhurst claims this failure is significant, that the messiness of bodies is often conceptualised as feminised and therefore 'othered'.

A concern was relayed to me by scientific staff that, as a result of an influx of refugees whom, on arrival, were not adequately screened for diseases such as tuberculosis, strict changes to protocols were enforced in order that public safety is maintained and protected. Previously undiagnosed diseases often become identified by accident when a person presents at Accident and Emergency with an unrelated health problem; medical practitioners, when examining someone presenting for treatment for a specific disease or ailment, might detect unknown unease and disease by investigating further – below the surface, looking past the obvious. A focus of my project is the dynamic nature of biological processes, exploring the notion of human system vitality and disruption; that the human system is not passive and is never static nor always safe.

To non-scientific persons, scrutiny of the body is most often confined to its outward appearance, its corporeality; the focus is not often its biology. Many years ago, a natural therapist said to me that, in her experience as a

therapist, women are more *in-tune* with their bodies than are men. Women *need* to be in-tune; a woman's body is adaptable and tied to materiality. A woman's body endures discomfort and pain in its manifestations; menstruation, pregnancies, birthing, breastfeeding, then menopause. Elizabeth Grosz (1994:14) contends that western culture operates through the identification that 'women are somehow *more* biological, *more* corporeal, and *more* natural than men'.

Androcentric notions in taught biology, that equates, man-woman active-passive, requires rigorous and critical interrogation. Feminist biology aims to effectively eliminate patterns of gendered active-passive biological myths and metaphors (The Biology and Gender Studies Group 1988:61-75). The course of researching both human biological processes and feminist visual culture led me to an exploration of theories of feminist biology and the critique of feminist biology, which is the application of feminist theory to the study of biology, identifying gender bias in taught human biology. Feminist critique interrogates the centrality of androcentric bias in accounts of gender. It is in this sense that my project aspires to highlight not only the body's biological processes but also its gendered myths and metaphors.

Exploring several notions of taught biology relating largely to reproductive activity, I compared findings to those of twentieth century biology theorists relying heavily on metaphors and stereotypes deemed to be central to our cultural definitions of man and woman. My research includes biological facts of sex determination and sexuality relative to what the layperson might believe to be true; how determination of sex occurs through distribution of early gestation sex hormone secretion, subject to anomalies and sensitivities insensitivities. I survey the development of this critique, beginning with The Biology and Gender Studies Group (1988), leading to more recent revisionist theories based on biochemical and biomedical evidence.

Biologist and feminist, Lynda Birke (2000), uses examples of chemical pollutants to explore some of the ways we think about 'nature'. Birke emphasises the multitude of ways in which gender or sexuality is created, in

particular, social contexts using the example of separation of feminism from 'crude biological determinism' (Birke 2000:589) including claims that how we behave is all down to our genes. Birke's concern is for women's health including the effects of chemical pollutants. Media discourses and scientific literature led Birke to analyse then deconstruct available data. Endocrine disruptors' is a category of chemical pollutants which, Birke claims, is notable in relation to breast cancer. Birke claims academic feminism and, surprisingly, ecofeminist activism has largely ignored them. The purpose of Birke's paper, 'Sitting on the Fence, Feminism and Gender-Bending Environments', is to draw attention to endocrine disruptors and women's health (Birke 2000). I include this author's research as an example of the fragile porous body, of trans-corporeality, our relations with the environment, and how this relationship is often fraught with accidental maladies, physical and physiological changes and often death.

Cancers and death have for many years been the majority indicators of toxic effects, these being the endpoints of laboratory studies in toxicology. Birke points to more subtle effects that do not result in death and tumours thus, they are often missed. Birke's interest and concerning example, in early investigations, is scientific research into the failing reproductivity of alligators in Lake Apopka, Florida. Not only had the population declined but scientists found male alligators had unusually small penises, and females suffered problems with ovaries and egg-production. The males, it appears, had been feminised as a result of a chemical spill from a nearby factory in the 1980s (Guillette 1994:589). Birke observes, many reports have since emerged pointing to the effects of chemicals on reproductive systems.

Birke references also scientific enquiry into fish habitats near sewage outlets in British rivers in which fish appeared to have changed sex; more precisely, males started producing the protein vitellogenin, normally produced by females and associated with egg-laying (Birke 2000:589). Birke questions, given the evidence of the effects of chemical on wildlife, can chemicals elicit similar effects on humans? Birke points to the concentration of chemicals in water having a more direct impact on wildlife whereas, effects on the human

system might affect a subtler condition over extended periods. Nevertheless, chemicals implicated in changes to the reproductive physiology of animals might be a factor in what scientists' claim is a steady and consistent decline in human male sperm count (Birke 2000:590). Other sources, Birke claims, highlight a global change in male fertility suggesting that increasing rates of breast cancer points to exposure to chemicals that affect bodily estrogen levels which, in turn, affect breast cancer tissue as a plausible culprit (Birke 2000:590).

One hypothesis, Birke insists, points to chemical pollutants that can alter hormone levels within the body and by various means. One possible route is the lock-and-key bodily receptor molecules on the surface of cells particular to specific hormones within the body. When the chemical message is attached to the receptor, a chain of processes is triggered within the body, even, it seems, when the chemical message comes from an outsider molecule. Birke claims, their exists many incidences of lock-and-key disturbances linked to disease and death (Birke 2000:596). While I do not evaluate Birke or her claims forming a scientific framework, my project, from its position at a nexus of art and science, aligns Birke's claims with concerns surrounding chemicals in plastics, pesticides, and a range of other pollutants and micro-molecules that find their way into the environment as a way to exemplify porosity, fluidity, our connection with materiality of 'nature', and ways in which entities and pollutants affect our bodily processes in trans-corporeality. In addition, I concur with Birke, that women's health issues, through attention to biology, might be addressed more readily in terms of potential effects on woman's health through neglect and a specific form of social construction whereby toxicology studies all too often establish standards based on men (Birke 2000:587). Similar critiques of gendered standards were made by the Biology and Gender Studies Group in 'The importance of feminist critique for contemporary cell biology' (The Biology and Gender Studies Group 1988:61-75).

The Biology and Gender Studies Group sees feminist critique as one of the normative controls that any scientist must perform when analysing data. The

Group seeks to demonstrate what happens when control is applied. Narratives of reproduction and sex determination contain traditionally modelled cultural patterns of belief of man-woman interaction which led to gender associations placed on cells and their components. Under controls of gender bias, new perceptions and patterns of intra and extra-cellular relationships emerge (The Biology and Gender Studies Group 1988:61-75).

My investigation begins with Maryanne Cline Horowitz's (Horowitz 1976:183-213) critique of Aristotle's notions of vigorous masculine activity versus feminine passivity in 'Aristotle and Woman' and her aim to elucidate later influences of the Aristotelean brand of anti-feminism. Aristotle characterised 'femaleness' by lack of maleness, describing the female body as a departure from the normality of the male body. Horowitz exposes old-wife tales on subjects of male and female embryology, that the man's semen produces form and impetus from which the embryo grows; the womb contributing only material nourishment. Horowitz claims, Aristotle's principle discounts a woman's importance in the one area where even a primitive or uneducated mind might otherwise suspect female superiority. Horowitz states that Aristotle extended this biased concept of man-woman biology into distinctions of maleness being active, femaleness being passive; maleness being logical, femaleness material. In addition, man's courage is in commanding, woman's is in obeying; matter yearns for form – the woman for the man or, the beautiful for the ugly; that woman has fewer teeth and is an incomplete man – a deformity (Horowitz 1976:183-213).

The miraculous process of fertilisation is humorously described by David H Freedman (1992) in his text 'New Theory on How the Egg Attracts Sperm' and its alternate title 'when it comes to describing fertilisation, biologists have got it wrong'. Freedman's stance describes the enormously wasteful swarm of sperm that flip-flops its way through the mucous of the uterus, the fallopian tubes until, having survived long enough to accidently find its way to an egg, the egg selects one spermatozoon and reels it in, despite its attempts to escape. The comparatively enormous and hardy ovum pulls the tiny spermatozoon into her interior to distil chromosomes in the beginnings of new

life. Freedman acknowledges that, until recently, most biologists described the process in a different way; sperm portrayed as intrepid warriors fighting their way to the passive egg which does little but await the arrival of the victor's final plunder (Freedman 1992). Freedman's account is one of many descriptors of fertilisation debunking man-woman biological myths and metaphors. Another is Emily Martin's (1991:68) text, 'The Egg and the Sperm: How Science has Constructed a Romance Based on Stereotypical Male-Female Roles'. Martin spent many years examining the metaphors used in descriptions of fertilisation in an effort to spotlight the male-skewed imagery of fertilisation, placing her at the centre of the debate about how cultural myths can turn into scientific myths.

Martin points to those stereotypes that imply not only that women's biological processes are less worthy than man's, but that woman, in every sense, is less worthy than man. In addition, Martin questions why menstruation and spermatogenesis are not expected to elicit the same type of response and, despite not being analogous, the proper female biology analogy to spermatogenesis is ovulation yet, ovulation does not merit enthusiasm in influential academic texts. Martin asks us to note, and question, the marked contrasts set up between man and woman. The man enjoys a continuous supply of freshly produced germ cells; the woman has only a stockpiled supply from birth, much of which faces degeneration. Accordingly, the term *degeneration* is imbued with negative connotations; that they simply sit on the shelf, aging like overstocked goods (Martin 1991).

In the true sense, fertilisation is an interactionist model based on biochemical evidence that the egg activates the sperm and the sperm activates the egg (Martin 1991). Reinforcing Martin's interactionist model, video footage form Northwest University in Chicago shows the instant a spermatozoon meets the egg (Figure 17). Fertilisation is determined when the egg comes into contact with sperm enzyme emitting a zinc flash; the size of the flash of light can be used to determine the quality of the fertilised egg – suggesting this might be a useful factor in IVF when scientists choose the healthiest fertilised eggs for

transfer. It is thought, the brightest sparks determine the best quality eggs, free, perhaps from genetic mutations (Paul 2016).

Figure 17: The fertilisation-induced zinc spark, https://the ameriacanconservative.com/Dreher/the-spark-of-life

In Sigmund Freud's (1933) 'Femininity', the third lecture in the series 'New Introductory Lectures', Freud stated, that when any of us meets another human, the first distinction made is 'man' or 'woman'. The distinction, Freud claimed, is made with unhesitating certainty; though perhaps not in twenty-first century and public and scientific recognition of behavioural plasticity (Snowdon 1997:276-293). In *Speculum of the Other Woman* (Irigaray 1985 (trans)), Luce Irigaray demonstrates that Freud's theory of sexuality is premised on one sex – man. First there is man and then there is absence, or the lack – woman. Freud's man, Irigaray asserts, is the paradigm of all sexuality, physical and biological changes and sexual pleasure. Irigaray points to Freud's 'lack' of woman and its failure to speak of the degeneration of breasts in man which, logic suggests, should be construed as 'lack'. (Irigaray 1985 (trans)) I suggest the term 'degeneration of breasts', used by Irigaray, is possibly misleading, rather; a more precise term might be failure to fully develop. Irigaray points to sexuality as the priori male for Freud, argued by Irigaray as 'One and its negative, man and not man, A and not A (or A minus)' (Irigaray 1985 (trans)). A is recognised; woman being a

negative, or only what it is not – man. The flat mirror, Irigaray asserts, reflects only to man, celebrating the fullness of man's identity. Woman is unrepresented, always '. . . off-stage, off-side, beyond selfhood', also, the logic is '. . . indicative of the privilege (a) of the male organ and (b) of the unitary notion of truth, where the patriarchal truth is the only truth' (Irigaray 1985 (trans)). In her seminal text, Irigaray associates the specular metaphor with feminist representation.

The speculum's curved surface delivers a deformed image, reversing the reflection of masculine discourse; a feminist symbolic of female embodiment (Meagher 2003:30). The curved surface represents the inner specificity of the female body. Specular is defined as *to look at*, from Latin speculari, *to spy*. The term speculum is associated with a mirror, usually of polished metal, and a medical instrument to dilate a bodily cavity for examination of its interior; a role with which most women will be familiar. Another meaning for speculum describes a distinctive patch of colour on the wing of a bird – mentioned here only as a reference to colour, not to the bird. I use the term a *speculative approach* in descriptions of my approach to my studio work; by this I mean I use abstract reasoning that is fundamentally led by visual arts practice. My work takes a speculative look at the interior of the body using abstract reasoning.

Probing the human body from both outside and within, the visual artwork of feminist Annette Messager reveals a keen interest in humanity and its fragile emotional core. Messager's creation is a menagerie of creatures; animal, human, some monstrous, all suggesting the complexities of life, its mythologies, superstitions, and the vanities underpinning it. From her earliest works exploring concepts of the feminine, to later works featuring dismembered soft toys and hand-stitched limbs and organs; the body remains central while identity becomes destabilised (Kent 1994) representing the shadowy 'other' within us.

Messager's vast installation titled *Penetration* (Figure 18), visualises a process of disembowelment of organs extracted and suspended from the

gallery ceiling. The artist stitched each element, using pink, red, and blue fabric, into recognisable caricatures of the heart, kidneys, digestive tract, and phallus, forming a forest of organs where three pink foetuses imagine the process of growth in-utero.

Figure 18: Annette Messager, *Penetration*, installation, 1981, mixed media, dimensions variable

The viewer becomes the fluid element between the organs. Messager describes her works as a fantasy inside the body, very strange and at the same time, disquieting. Suspended light bulbs cast shadows across the gallery floor and walls, swaying as visitors move between the objects in a heightened visual drama (Kent 1994). Messager uses the element of fluid movement to suggest the vitality of life paralleling my notions of the dynamic human organism. My structures force a viewer to move between elements of the installation, following a trail of light. A single projection delivers an embodied, inclusive experience, of being within.

Visual data from the residency, in addition to my exploration of bodily ordering and imaging, concepts of creativity, and philosophical approaches to gendered biology contextualise the materiality of the human body. I now explore ways to extend my concepts in themes furthering my notions of embodiment, awareness, and consciousness.

Section Three: Visual strategies – flow, pattern, and abstraction

In this section, I engage with psychology to extend my concept to the human organism's porosity, fluidity, poiesis, notions of patterning in replication and renewal. I explore concept and psychological notions of markings as these relate to visual systems; suggestions of consciousness and the creative product; how artists transcribe and convert observations of science and nature; the identifiable and the familiar, including Gestalt theory, leading to classical renditions of formal and informal patterning in addition to how other artists choose to describe their worlds. These concepts are interrogated by several writers, theorists and artists. I explore the material workings of the mind in embodiment including a poem's humorous look at an embodied experience. The formality of Islamic and Byzantine art and decoration is examined in culturally traditional examples, and that contemporary Islamic art continues to employ culturally significant and recognised symbols. This section ends with a personal account of a visit to the Middle East.

In a study titled *Visual perception of markings* (1996:171-187) relating to images, William H Ittelson tells us that markings are a subset of all two-dimensional patterns on the surface of three-dimensional objects. Ittelson claims that while we commonly refer to marking as being two-dimensional, the environment and all the objects in it are, in human terms and by human scale, three-dimensional. No matter how thin and transparent, or how thinly we render an object, the resulting lamina remains three-dimensional (Ittelson 1996). Ittelson's thesis tells me, fluid human viscera smeared onto glass for clinical laboratory examination is three-dimensional. Microscopically thin slices of wax-embedded human material are three-dimensional; its thinness might be beyond my comprehension nevertheless, it is a three-dimensional substance captured within or on a three-dimensional object. The concept of two-dimensionality in the world, Ittelson insists, is a human construct (Ittelson 1996). I understand and respect Ittelson's theory of two and three-dimensionality however, it is a conundrum; as an artist working predominantly

in the realm of what is known as two-dimensional art – on paper or canvas, I question art's long-held conventions of what is accepted as two-dimensional art and three-dimensional art.

Markings are psychologically important precisely because they provide information about something other than the real-world situation in which they are encountered. Markings are characterised by two properties; firstly, markings appear on a surface, but are not simply part of the surface, rather, a marking is an addition to the surface – their informational content is de-coupled from its real-world source; secondly, markings do not occur naturally – they are intentional, expressive, communicative human artefacts. In another example supporting theories of Johnson, Peat, and Gombrich, Ittelson claims that humans possess a remarkable ability to process information without our noticing; that we are not always conscious of the brain in a constant state of processing. Markings exist because of the human capacity to receive a class of input from the external world and to translate the informational content of the input from its real-world source to data that suits our needs at any moment in time. To understand this ability, it seems necessary to first consider the generally accepted adaptive role of vision and visual systems, which is to provide the organism with reasonably accurate information about relevant aspects of the immediately present world and our place in it (Ittelson 1996).

Visual systems are super-efficient and essential to the human organism for existence and survival. The human visual system possesses the capacity to categorise certain types of visual information that has nothing to do with the state of the immediately present world. Ittelson claims *de-coupling* of information from its source is the defining condition for the production and perception of markings (Ittelson 1996). I refer to my practice of unconsciously adapting visual data, when required, in order to comprehend the complexities of microscopic human anatomy and biology. Ittelson's study starts with this fundamental difference between the visual perception of markings and the generally recognised adaptive function of the visual system; the ability to recongnise markings out of context. Ittelson's terminology is explicit; a

marking is a pattern that appears on a surface and, whereas the surface can exist without the markings, the markings cannot exist without the surface (Ittelson 1996). This might be true of markings I place on my models. It is, however, not true of the source of my images, which is the visual data gathered from bodily material during wet-lab studies supported by observations in the pathology residency. Visual data, transferred to three-dimensional objects belongs, rather, in a place where material supports material; matter on matter – the reality of materiality supporting my embodied making of markings.

David Peat (Peat 2012) suggests consciousness arises out of processes deep within the body, to be projected by means of art onto the external world where they can be internalised into awareness in others. This, Peat claims, involves purposeful manipulation of internalised mental states and concepts, the source of which lies deep within us in a hypothetical location (Peat 2012). Adaptive processes provided me with ways to understand and recall complex data whilst in a state of disabling confusion. My mind processed available data by way of a manufactured or a new way of seeing. I apply both Ittleson's and Peat's theories to my concept of human biological patterning; that I am providing an explanation in an alternative view of nature's patterns and how I see the order of things within the human organism in the realm of the linearity of a series of two-dimensional layers in a three-dimensional artefact. I use the term *linearity* to describe an unbroken line or process proceeding in a straight or direct way yet allowing it to change its biological form from one set of molecules to another that activates a repeatable outcome. The concept of linearity takes me to my study tool resource in a colourful flow-chart style that allowed me to visualise the human system and its fluid processes.

Artist Brendan Monroe draws inspiration from science, transcribing and converting observations into paintings and sculptures. In an example of Ittelson's theory of markings, Monroe describes his creative output as a reflection of the deepest of his subconscious which is a place of comfort, an escape from reality, and a universe that is an invention of mind; beautiful, vast stringy landscapes (Zio 2016). Where I translate details of visceral

porosity and flow of the human organism, Monroe imagines the undulating waves of an upside-down sea in awareness of the flow of water over a landscape, complying with the mechanics of motion and gravity. Philip Ball (2009:129) tells us there is nothing new in ideas of transient forms of fluid flow having artistic appeal. Images of fluid flow, in the landscape for example, become frozen in the instant of a camera's flash or captured in paint on canvas. The discipline of fluidity or flow is variously known as hydrodynamics, fluid mechanics, and fluid dynamics. The theory of fluid dynamics, for laypeople, is best observed and most compelling in drawings and paintings and, Ball insists, by writing not equations but prose; observing flow delivers a sense of grasping the intangible (Ball 2009:131). Monroe's work is not immediately related to what I represent; nevertheless, the artist's thought processes and creative output supports my mindset in its questioning, that he explains in his work as a conscious awareness of patterning within fluid movement. By this I understand, Monroe brings his unconscious or intrinsic knowledge of fluidity into conscious awareness through creativity.

Figure 19: Brendan Monroe, Waves, 2015, for the Juxtapose and Converse Wall to Wall project, San Francisco

I refer here to Peat's use of consciousness and sub-consciousness of which, he states, we are rarely aware. In a clarification of what he terms *consciousness* and what he terms *awareness*, Peat determines that

consciousness is the entire operation of mind and body which is the source of behaviour, intention, intuition, mood, inspiration, and creativity. Consciousness descends deep into the realm of pure matter which, he claims, is not open to general awareness, and much of what is valuable and creative lies outside the fleeting and transitory domain of awareness; a mechanical device hovering around our awake time (Peat 2012). Consequently, distressing experiences can be actively suppressed or become encoded memories in our sub-conscious and whose associations elicit certain extremes and states of panic, fear, and even elation (Peat 2012). I could not have known, so many years ago, that my introduction to human cadavers in wet-lab anatomy would lead to a major project, nor the affective moment when a glaringly sterile environment brought about profoundly changed processes of mental organisation, dictating that I would forever see and imagine the human body in a different way. Through necessity, I devised an abstracted notion of the dynamic organism.

My expression of the human organism is anonymous, non-objective, non-figurative. In a visual taxonomy, Gerhard Richter states that he tries to avoid anything in a painting resembling a thing, an object; that to do so reduces the painting to its visible and identifiable objects. Richter claims it is a terrible thing when all the viewer sees is the object. Further, he argues, we only find paintings interesting when we search for something familiar to us; not finding something we can put a name to frustrates us to the point of excitement and interest until we turn away out of boredom. This, Richter claims, is how abstract art works (McCarthy 2011). Before I proceed to questioning Richter's claims, I should first declare that I have, for many years, followed Richter as an artist. I appreciate his techniques and his art.

I am at odds with the *identifiable* and *familiar* in Richter's statement, which contradicts itself in his view that abstracted work might result in boredom in its lack of anything identifiable. I question why a state of excitement and interest should result in boredom? Rather, abstract art can draw in an audience often to the point of having a meditative quality; an example of this is in Barnett Newman's and Mark Rothko's colour-fields. Inside Rothko's

Chapel in Houston, Texas, rustic wooden benches and prayer mats provide visitors a place to meditate, to problem-solve and, at times, to cry. In Richter's abstract works, there is nothing to recognise yet there is no sense of boredom. Luminous colour-fields that made Rothko famous do not feature in his Chapel rather, the walls are adorned with dark, even black paintings described as windows to beyond. Rothko believed his bright colours stopped vision at the canvas whereas, the dark allows imagination to go beyond; to the infinite (http://www.npr.org/2011/03/01/134160717/meditation-and-modern-art-meet-in-rothko-chapel 2011). What appears to be solid black, on close inspection, reveals itself in washes of pigment and waves of subtle colour differences delivering an impression of enormous depth and, to some, a sense of peace.

Figure 20: Mark Rothko, Central Triptych, 1966, Rothko Chapel, Houston, Texas, no other information available

Figure 20 demonstrates Rothko's differences in the dark central triptych painting for the Rothko Chapel, in comparison, Figure 21 demonstrates the luminous colours used in the artist's earlier works.

Figure 21: Mark Rothko, White Center [sic] (Yellow, Pink and Lavender on Rose), 1950, oil on canvas, 205.8 cm x 141 cm

I point to Rothko's colour-fields as examples of abstract art where the viewer is drawn to the work; not with the intention to find something familiar rather, as an experience transcending objectivity. Familiarity or identity might come in the form of pain or grief through the meditative qualities of the work's depth of colour and subtle blending.

Barnett Newman and Rothko deliver a similar viewer experience in paintings that are meditative. Newman's *Onement 1* features the full incarnation of what would become known as Newman's zips. Newman's flat uneven zips painted on flat fields of colour fail to divide the canvasses rather; both sides merge to draw an audience in for an intense emotional experience. The zip simultaneously divides and unites the composition. Newman's work is existential in tone, composed with the intention to communicate a sense of presence (https://www.moma.org/collections/works/79601).

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Figure 22: Barnett Newman, Onement 1, 1948, oil on canvas and oil on masking tape, 69 cm x 41 cm

Newman's mammoth *Vir heroicus sublimis,* translated from Latin to English means *man, heroic and sublime,* was his largest (Figure 23). In this piece, Newman's intent was that the audience would view the work from a close vantage point allowing its colours and its zips to surround them. Its zips are variously solid or wavering creating a perfect square in the centre with asymmetric spaces at its perimeter. At the time, the work created a new kind of contact with the viewer. Newman likened the experience to a human encounter, a reaction to the physicality of a person or, in a metaphysical sense, that the meeting is meaningful. Lighting directed at the painting is reflected in order that the viewer becomes bathed in red https://www.moma.org/collections/works/79250.

Figure 23: Barnett Newman, Vir heroicus sublimis, 1950-51, translated as Man, heroic and sublime, oil on canvas, 242 cm H x 542 cm W.

I return here to Gerhard Richter's work as I identify with a common theme in his work, which is the element of *chance*, embraced in Abstract Expressionism and Conceptualism. In Richter's abstract canvasses, there is no emotion or mimicking of anything found in nature or existence that accords to any pre-determined structure; a contradiction of Richter's notion of abstraction and boredom. Richter combines the unpredictability of chance with other forces. Richter's 2007 commission to design a stained-glass window for Cologne's Cathedral extrapolates patterns, taxonomic forms, and random sequencing thrown around by chance. As one of Germany's most important living artists, Richter's design is a kaleidoscope of light and colour in 11,500 squares of glass in seventy-two colours. The cathedral's original twenty-metre-high window was destroyed during WWII. In 'Pixelated Stained Glass', Amanda Fortini tells us the design was inspired by Richter's 1974 work *4,096 colors* [sic], one in a series of abstract colour-field paintings initiated in 1966. Richter's nods to formality reference architectural history using a coordinated palette with the existing window in addition to his submitting to Gothic tracery (Fortini 2007).

Richter uses chance in random selections of colour with no stringent plan or layout. Nevertheless, vague patterns emerge. I see this as an unconscious and unintentional human trait. Richter's Cologne Cathedral windows design illustrates how humans possess a variety of innate mechanisms that provide extraordinary abilities to compartmentalise life through all manner of

expressions so that individual meaning emerges in shapes that reflects emotions.

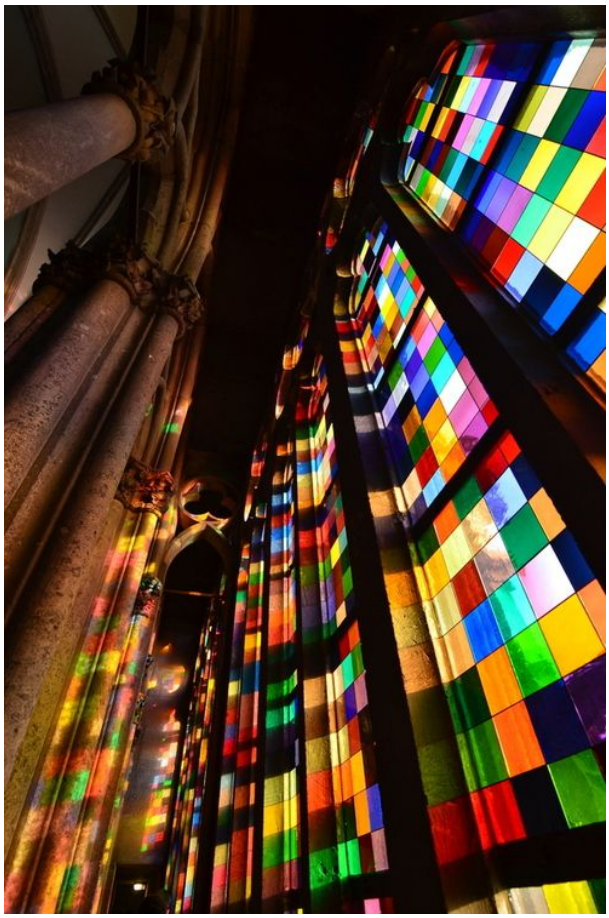


Figure 24: Gerhard Richter, Cologne Cathedral Window, 2007, Cologne, Germany

Adkinson (2009:35) suggests that pattern represents order giving materiality to the workings of the mind in reactive and subjective attachments to reality formed in patterns. I question if Richter's random selection produced unintentional patterns. In psychological terms, human cognitive processes identify and focus on pattern as culturally and historically meaningful (Adkinson 2009). Mark Johnson's *The Meaning of the Body* (Johnson 2007:38) suggests, in cognitive processes, there is a necessary background disappearance of process, of which we are barely aware, described by Johnson as the many thousands of dynamic yet non-conscious bodily processes, movements, and adjustments involved in producing a simple physical outcome that contributes to awareness.

I liken Johnson's theory to a significant and inherently enjoyable element of my studio practice; that is, engaging in experiments with media and processes to which, in response, an acute level of awareness is achieved, not only of the process and its outcome, but in the all-encompassing physicality of engaging with material. When a process is no longer new, I am aware only of outcome and, in this sense, the process is reduced to a semi-automatic response to the media that no longer delivers a physical experience. In turn, I become devoid of enthusiasm and in no small part separated from the work. Central to Johnson's thesis, and chief among the embodied activities, are aesthetic qualities, images, patterns of sensorimotor processes, and emotions (Johnson 2007:38). My studio is a space where I feel free to experiment, to find and connect with newness so that I do not fall into a void of non-enthusiasm. Experiments, new materials, reactions between non-compatible substances in processes provide the embodied experience I crave.

Art-making can be expressed in symbolic terms of nothingness, a blackness, or a tense state of withholding that precedes creative output until intention is realised. David Peat (Peat 2012) describes the state of creative depression as the physical body holding onto or containing the intended work where it matures before being expressed. Then there is a state that represents concrete thinking, where imaginative thinking and knowledge form to then be expressed as the products of creative thought.

In the state of withholding, which can be, contrarily, a state of frustration and angst, or the mental act of relaxed thought, of giving oneself permission to renounce the angst when, in a subsequent release of tension, ideas and words that previously escaped us begin to flow; everything in life flows if we allow it to do so. Previous experiences, hidden within the fundamental ground, and long forgotten, find their way into expressions in influenced outcomes. Important phases take place in processes of consciousness that lie outside mental awareness. Even as work progresses, bodily consciousness and awareness continues the role in internal tensions and sensations, or intuitive feelings of self-critique, determining the value we

place on the works completeness, and contributing to its ultimate success or failure.

The relationship between mental properties and physical properties is vexed. The human subjects' physical properties can be seen with the aid of scientific equipment and a particular expertise; the smallest and least accessible human parts – cells, minutiae – are made accessible and visible. Unlike physical properties, mental properties, or conscious mental events are private and invisible. Ontologically, what is a mental state and what is a physical state? Causally, do physical states influence mental states, and vice versa?

Mind-body dualism holds the view that mental states are non-physical; the mind and body are inseparable encompassing notions about relationships between mind and matter. Materialism disputes such aphorisms asserting rather, that both mind and body are composed of matter, there is no unobservable force. The arguments of Rene` Descartes (1596-1650) duality and Thomas Hobbes' (1588-1679) materiality represent both sides of the debate in which Jason Morrison (1997) succinctly describes Descartes' theory thus; 'I cannot doubt I have a mind, but I can doubt I have a body' (Morrison 1997).

Elizabeth Grosz (1994b:8) outlines a subversive approach to the Cartesian dualism of mind and body, interior and exterior. Grosz illustrates a way to overcome the inner and outer, thought and materiality dichotomy using the Mobius-strip, which is a three-dimensional figure-eight form in which there is no clear distinction between its two sides; its outside becomes its inside and its back becomes its front. Grosz explains, the figure demonstrates 'the inflection of mind into body and body into mind, the ways in which, through a kind of twisting or inversion, one side become another' (Grosz 1994b). Contradictorily, in *Purity* (1991), American former Poet Laureate Billy Collins looks at himself from the outside in an absurd yet entertaining suggestion that thought and imagination come only through a body divest of its parts. Collins writes:

My favourite time to write is in the late afternoon. Weekdays, particularly Wednesdays.

This is how I go about it:

I take a fresh pot of tea into my study and close the door.

Then I remove my clothes and leave them in a pile as if I had melted to death and my legacy consisted of only a white shirt, a pair of pants and a pot of tea.

Then I remove my flesh and hang it over a chair. I slide it off my bones like a silken garment.

I do this so that what I write will be pure, completely rinsed of the carnal, uncontaminated by the pre-occupation of the body.

Finally, I remove each of my organs and arrange them on a small table near the window . . . I do not want to hear their ancient rhythms when I am trying to tap out my own drumbeat.

Now I sit at the desk, ready to begin.

I am entirely pure: nothing but a skeleton at a typewriter.

I should mention that sometimes I leave my penis on. I find it difficult to ignore the temptation.

Then I am a skeleton with a penis at a typewriter.

In this condition I write extraordinary love poems . . . most of them exploiting the connection between sex

and death.

I am concentration itself: I exist in a universe where there
is nothing but sex, death, and typewriting.

After a spell of this I remove my penis too.
Then I am all skull and bones typing into the afternoon.
Just the absolute essentials, no flounces.

Now I write only about death, most classical of themes
in language light as the air between my ribs.

Afterward, I reward myself by going for a drive at sunset.

I replace my organs and slip back into my flesh and
clothes.

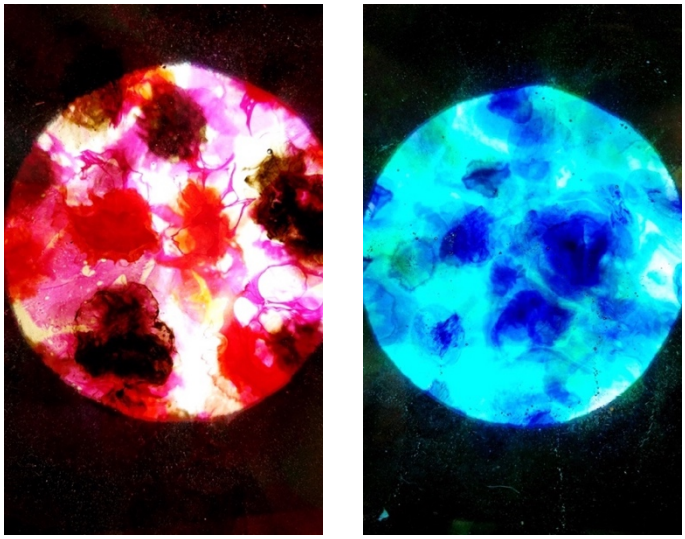
Then I back the car out of the garage and speed through
the woods on winding country roads, passing stone walls,
farmhouses, and frozen ponds, all perfectly arranged like
words in a famous sonnet.

Billy Collins (Collins 2003).

I question if Collins' intention in *Purity* is to demonstrate that his best writing is done when he is at his most vulnerable or simply a charming but wry reminder that the complete organism gives us meaning and shapes our thinking (Johnson 2007:38). The latter suggests that creativity is holistic; conceived not only of the material body but in its sentient somatic knowledge; the body's ancient drumbeat. The poem pays close attention to what the body tells us about sensuality, reality, fantasy, and existence; all which might elicit an embodied experience that allows creativity to be effectively conceived, expressed, reviewed, analysed, and interpreted.

I refer to embodiment as the combined physical, psychological, and emotional presence of the body which are integral to subjectivity, emotional

thought, language, and interaction with others. Therefore, embodiment is an existential condition of which the body is the subjective source or ground of experience. In 'Body Art', Francois Pluchart (1974) describes the body as '. . . the fundamental ground. Pleasure, suffering, illness and death inscribe themselves on it and shape the socialised individual during its biological evolution' (Pluchart 1974:218). Pluchart explains that the body is put in readiness to satisfy demands and constraints of existing forces and that no one can escape the imposed oppression placed upon it by life's experiences. Experiences possess the ability to affect physical and mental health, leading often to neuroses and illness, to auto-immune disease where, under microscopic scrutiny, forms of patterned colour deliver the evidence of life's brutalities.



Figures 25 & 26: Susan Quinn, 2017, studio work, pigment in resin on acrylic, 20cm x 20cm

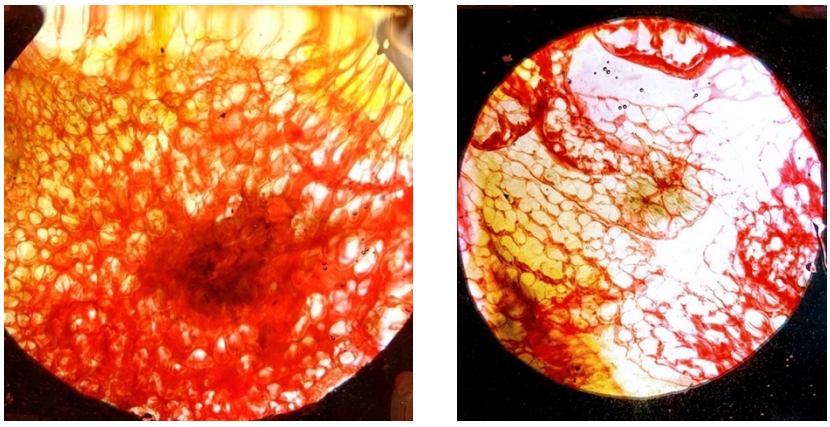


Figure 27 & 28: Susan Quinn, 2017, studio work, pigment in resin on acrylic, 20cm x 20cm

I respond to microscopic images in the studio using layers of colour that form visible patterns in representations of pathology diagnostics.

In a conceptual reference to representations of the human body, I include Ian McKeever (Figure 29) whom historically combines the three disciplines of painting, drawing, and photography in juxtaposed elements, but is more recently fully engaged with painting using an abstract language in bodily representation. Final transparent layers of paint evident in McKeever's *Assembly Paintings* conveys a fluid and porous quality in spheroids alluding to cellular and molecular activity. McKeevers' works are usually monumental in size; a process that delivers a spectacularly breathtaking quality that small works depicting the human body often fail to achieve. By this I mean, small works often contain beautifully exquisite and intimate detailed qualities albeit in a different aesthetic. The embodied experience in dimensionally large works parallels the intimate quality of small works. Each possesses its own unique aesthetic quality.

Figure 29: Ian McKeever, Assembly Paintings, 2006 – 2008, Oil & acrylic on linen or cotton duck, 190cm x 270cm

I refer to the larger than human dimensions of McKeever's works as spectacular, imposing, immersive in their physicality, engaging the viewer in responses similar to the works of Rothko and Newman. The embodied aesthetic can be experienced not only in large-format colour-field and abstracted works but also in formal arrangements and patterning in repetition. Profound descriptions of representation of the world are seen symbolically through orderly arrangements, in patterns and motifs often defined as culturally defined markers of human fears, motivations, and beliefs (Hattstein 2010:35).

Such descriptions are clearly defined in Islamic and Byzantine art. Possibly the most recognisable and distinguishing feature of Islamic art is its formality in geometric patterning assembled from simple shapes; circles. squares, and vegetal motifs combined and duplicated, then interlaced in intricate combinations expressing possibilities of infinite growth in all directions. A personal fascination with Islamic and Byzantine art has the effect on my work in the studio whereby I force myself, often, to resist the temptation to be prescriptive, controlled, and orderly.

In 2012, in a trip to The Middle East, I witnessed Islamic art in-situ including ancient museum pieces and Abu Dhabi's relatively new Grand Mosque, also known as Sheikh Zayed Mosque (Figure 30). The mosque is a site of pure white marble, chosen for its symbolic qualities of purity and piety. Its design combines Mamluk, Ottoman, and Fatimid styles of decoration (Hattstein 2010:37). The Mosque consists of courtyards in immense expanses of marble, numerous minarets, eighty-two domes, and seven enormously-scaled chandeliers.

Figure 30: The Sheikh Zayed Grand Mosque, Abu Dhabi

Figure 31: The Sheikh Zayed Grand Mosque, Abu Dhabi, interior of one of many prayer halls

Figure 32: The Sheikh Zayed Grand Mosque, Abu Dhabi, interior view

A visual feast of exquisitely skilled work welcomes visitors in contrasting inlays, carved and sandblasted glass expressing vegetal and geometric symmetry and repetition, successfully combining customary and contemporary techniques. The Mosque is spectacularly imposing in the landscape; its first sighting is disconcerting, its presence overwhelming.

Despite its enormity and grandeur and its breathtaking beauty – and it is, indeed, exquisitely beautiful – the Grand Mosque is not entirely indicative of the art I observed in the Middle East. I see, in the Grand Mosque, an indulgent and excessive show-piece representing a power that many associate with wealth and control. My perceptions elsewhere in the Middle East are that the art is complex yet humble in intricately rendered patterning. The dichotomy lies in rich, colourful, repetitious patterning that is not harsh but gentle on the eyes; bold, harmonious, and always complex.

In *Islamic Art and Architecture* (Hattstein 2010:35), Peter Delius and Markus Hattstein explore the fundamentals of the art of the region. Figural imagery was at one time considered unnecessary, necessitating other themes of decorative patterning that gained importance, including geometric and vegetal elements of design which, in pre-Islamic times had been subsidiary but transformed in Islamic times into major artistic themes. Artisans adapted creatively, progressively establishing a new style deviating substantially from Roman and Greek art to invoke a belief in abstraction, at the same time rejecting depiction of living forms. The use of vegetal forms in Islamic art is conditioned to some extent by the prohibition of imitations of living creatures. Rather than expressions using bodily forms familiar in other cultures, philosophical concepts connect to ways of transmitting the message of Islam. The art of Islam sees humans as an instrument of divinity created by a supremely powerful ‘Being’ rather than seeing the human form as nature’s most magnificent and beautiful creature (Saoud 2004:2).

Over time, vegetal subjects developed into increasingly stylised, abstracted and geometricised motifs. Simple leaf shapes, subjected to the laws of

geometry, emerge as patterns that not only fill surfaces but do not distinguish between the ostensible subject of the decorative patterning and its background. Unconstrained yet conforming patterning extends infinitely in all directions. In this manner, vegetal scroll-work patterns assimilate with geometric frameworks (Hattstein 2010:37). Rabah Saoud describes characteristics of Islamic patterning as an analogy of geometric design and mineral crystalline forms. Representation developed into abstraction rather than the realistic and can be seen clearly in vegetal forms where branches of trees plants and flowers interweave and interlace into the geometric lines containing them (Saoud 2004).

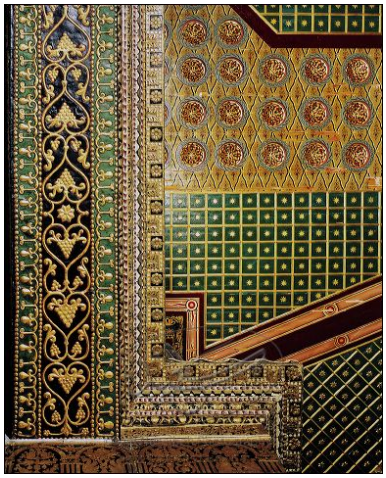


Figure 33: The Dome of the Rock, Jerusalem, interior detail

Figure 34: Dome of the Rock, exterior view, detail

Skilfully integrated vegetal motifs and geometric forms combine in Figure 33 whereas, in Figure 34, three modes of patterning combine to include calligraphy within the overall design. Culturally significant art of the region continues to be preserved in the art of contemporary artists from the region who integrate classical patterning and motifs with contemporary themes.

A personal fascination with pattern and patterning links me to contemporary Iranian artist Monir Shahroudy Farmanfarmaian's art in its intuitive and painstakingly crafted combination of mirror mosaics and reverse-painted glass. Shahroudy Farmanfarmaian successfully integrates traditional patterning from her Iranian and Persian heritage with modern western geometric abstraction. Shahroudy's work is built around principles of Islamic geometry in an interaction of surface, texture, light, reflection, colour and form. The characteristic mirror mosaic of Shahroudy's work is an Iranian decorative form called *aineh-kari* (meaning working with mirror) dating back to the 16th Century when glass was first imported from Europe. In expressions moving beyond craft in a practice exploring early techniques in a contemporary way, Shahroudy's work hints at architectural forms layered with coloured lines exposing the forms of nomadic tents, minarets, and models of architectural sculpture (Frank 2015).

Figure 35: Monir Shahroudy Farmanfarmaian, Lightning for Neda, 2009, mirror mosaic & reverse glass painting, overall dimensions unavailable

Monir Shahroudy Farmanfarmaian evidences how form and pattern, inherent in the art of the region, influences contemporary art. Repeated domed and arched symbols evidence a particular type of formality. The Middle East is

rich in art and decoration in both its traditional, classical form and in the work of contemporary artists.

My second, 2017/18, trip to the Middle East enabled a visit to the newly-opened Louvre Abu Dhabi Museum. Designed by Jean Nouvel, the museum opened on 8 November 2017. My motivation to visit the museum was two-fold, having followed the design from inception through to its opening, my interest lay equally in its exquisite structure and in its contents. If I was fully engaged to witness the museum's content – much of which I had seen only online and in books – I was overwhelmed by its structure. My appetite was whet several years ago when viewing a documentary celebrating design in general but highlighting those of Nouvel's Louvre Abu Dhabi, a Guggenheim, and a Sand Rose inspired Museum for Qatar. The documentary served as a catalyst and a slightly obsessive following of its progress from design through to development processes and, the reality of a visit in the opening month.

The Louvre Abu Dhabi sits on Saadiyat Island (Island of Happiness), land reclaimed from the sea. Translated as 'the place of enlightenment', Manarat Al Saadiyat, is an arts and cultural centre. The Louvre Abu Dhabi is the first of five museums planned for the island and forms the heart of the development to be known as a museum of civilisation. The name 'Louvre' is on loan for thirty years, loans and curatorial leadership for fifteen years, with continued support and assistance for ten years. Abu Dhabi's Saadiyat Island promotes the Emirate as the cultural centre of the United Arab Emirates (https://www.louvreabudhabi.ae/en/about-us/saadiyat-cultural-district 2016).

Approaching Saadiyat Island from Abu Dhabi city, The Louvre's grey dome, while straddling low to the ground, is spectacularly prominent. The dome is the construction of eight layers of latticed metal creating 7,800 perforations; a delicate looking structure from a distance, then robust in close proximity. Daylight filters through to the interior creating dappled light on the stark white walls of fifty-five pavilions situated under the protection and shelter of the dome. The domed roof was designed with deep respect for Islamic patterning and local interest in mathematics and cosmology.

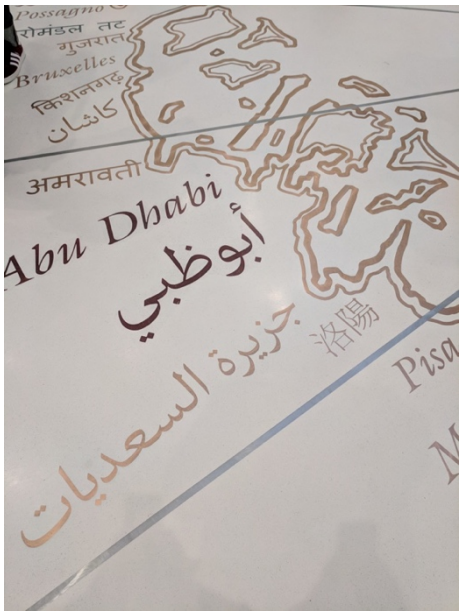


Figure 36: The Louvre Abu Dhabi

The exhibition's theme is civilisation and humanity. Bronze inlayed marble floors provide maps of civilisation and humanity relevant to the periods on display within each pavilion. (Figure 36) Wide promenades link pavilions, some containing only a small number of exhibits – others crammed a little too full.

The single yet significant element of Abu Dhabi's The Louvre resonating with my project is the domed, latticed, layered roof. My concept explores layers, porosity, and fluidity in biology; the dome resembles a membrane protecting a biome, an organism, a porous membrane allowing light and other living and non-living matter to filtrate, a visible skin separating that which is outside and the biome below. In a reverse action, the membrane allows light to escape after dark; an osmotic action of exchange and balance. Light seeps into the biome during daylight hours; light seeps out from the biome during night-time in a reciprocal or reverse osmotic-like action. I see The Louvre Abu Dhabi's inaugural show as its biota; a chronological geographical history of humanity protected by its porous, patterned, domed membrane.

Figure 37: First view approaching The Louvre Abu Dhabi via bridge to Saadiyat Island, 2017, dome and white pavilions visible

Figure 38: Under the lattice, layered, pierced dome overlooking waters of The Gulf, Abu Dhabi, 2017

Figure 39: Overlooking the waters of The Persian Gulf at the edge of the dome, 2017

Section Four: iterative studio research

This project has allowed me to develop a body of work that expresses a changed way of thinking and seeing. I have come to know and better understand the human organism through a momentary traumatic episode, of observation in a busy hospital pathology laboratory, and in the studio engaging with reimagined, reinvented tools, materials, and substances. I am drawn instinctively to types of substances that support how I see biology in my mind; seeping, oozing in porous human matter. My creative practice delivers instant gratification, where I watch a substance move, infiltrating its neighbour to form a porous boundary where applications of colour seep and mingle. I am aware, instantly and instinctively, whether or not the process has delivered the desired effect. Barrett suggests, 'It is in the heat of creative practice, the workings of material process orchestrate what is laid down as an unconscious mark in a painting or a movement in dance' (Barrett 2013).

This section of my paper describes preparation for each of my five exhibitions in subheadings, beginning with *Porous Bodies* (November 2016), culminating in preparations for my submission exhibition (February 2019,) including experimentation that lead to a body of work for installation. It is here that I describe *what* I chose to do, *why* I chose to do it, and *how* this is achieved.

Studio: Stage One

Preparation in early candidature centred around concentrated research that enables my establishing connections to human biology. It was a time to engage with artists, writers and thinkers while dabbling in experiments with media. Time spent experimenting gives rise to thoughts and ideas that may or may not develop. Ideas become organised in a form of preparation that allows an open mind to absorb information that might, or might not, crystallise into ideas and prospective new work. By this I mean, active thinking stimulates the imagination during activities that might not require full concentration – as opposed to passive thinking, when the mind is inactive.

Body and mind activity is involved in the process of stimulating muscles and neurons that perform more effectively when in tandem with other activities hence; I discovered, it is when the mind is most occupied that ideas form. I find it mindful, therefore, to be alert to this and ready always to document rogue and random thoughts – what might be useful otherwise later escapes me. At the other active-passive extreme, problems often resolve when the mind is in its most relaxed state, immediately prior to deep sleep, twilight sleep, when body and mind, relieved of pressure and anxiety, opens channels to both creativity and problem-solving. I derive enormous benefit from taking advantage of both states of consciousness.

My practice in this project can be defined in experimental processes, materials and techniques. It is when I am manipulating substances that I am stimulated and motivated. Combining incompatible substances is an approach that excites me; applying heat, a flame, unplanned and spontaneous methods that affect a reaction. Breaking rules of compatibility occasionally delivers a result that takes my breath away. Alternately, the result might be a sticky mess. These are the joys and frustrations of experimenting, accepting frustration to experience the joys.

My unconventional use of painterly substances suggests a loose approach, demonstrating a propensity for accidental outcomes. This is true at the level of spontaneous action and chance; nevertheless, experiments usually require elements of planning and control. Spontaneity occurs when the urge to experiment takes hold, when a previously unused substance is discovered for its propensity for effect on other substances or to affect an aesthetically pleasing reaction. Chance is accepting outcomes of spontaneous actions, planning is deciding why, when, and how to use each substance. Control is exerted when a substance is delivered, how it is delivered, how much is delivered, and how I allow substances to react to external applications of heat or chemicals. Each result, from previous experiments, plays a role in early studio engagement.

During stage one of studio engagement, I identified what was to be represented. Big-picture aims for this project contain speculative and conceptual representations of patterning in biology. As previously discussed, this type of patterning is not highly organised or tightly woven as one would see in, for example, Islamic and Byzantine art. The referent human biology is nevertheless highly organised in processes keeping the human organism alive and healthy and expressed in concepts of poiesis, porosity, fluidity, and fragility, continuous movement, transparency, and delicate boundaries. Notions of porosity are integral to the concept. Porosity allows movement across semi-transparent membranes in layers where human matter and entities – the 'other' – become enmeshed through seepage in trans-corporeal activity.

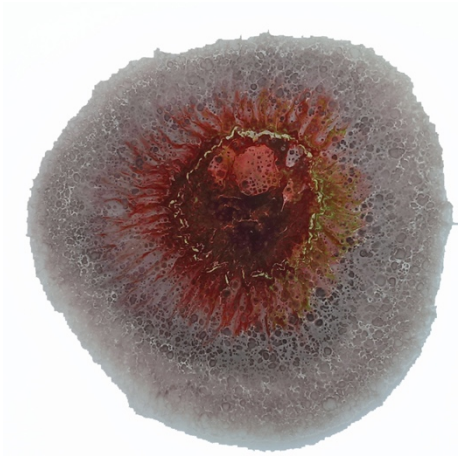
Within the foundational and affective experience of the wet-lab, a standout recollection, agential to early studio work, is the highly illuminated, sterile shiny white tiles lining the walls and floor of the laboratory. As a starting mini-project, I chose to highlight this recollection in a small body of work using pigment in resin on tile-size pieces of opaque white acrylic sheet. (Figures 57 & 58) Resin is an unpredictable solution, which is one of the reasons I choose to use the medium. My natural wont is twofold; to render detailed work in fine brushstrokes, often using brushes held together with only a few hairs hence, I instinctively try to control my medium of choice. This technique delivers 'tight' art. There is a place for tightly rendered art delivering fine detail in works but which fails, however, to deliver the looseness of fluidity and movement I aim to achieve.

Several years ago, in a bid to distance myself from constricting work, I developed techniques delivering flowing art using copious quantities of paint, utilising paint scrapers and other tools; some flexible, others rigid, that effectively spread layers of paint with additions of incompatible substances to affect change. This type of work usually involves large format substrates as supports; board, plywood, acrylic sheet, aluminium sheet (first given a patina that I use as backgrounds and to give tooth to the surface). None was useful in the execution of this project.

I thrive on experimental processes, which provide me with a broad-ranged approach to art-making. Techniques become stored for future use that might depend on a particular aim. For this project, the aim is to demonstrate fluidity and movement. Using resin, the desire for this aesthetic results in many failed works when fluidity, for many reasons, is out of control. The resin I choose to use is Glass Coat, a two-part self-levelling, crystal-clear epoxy resin. Climatic conditions determine viscosity. Flow or fluidity increases in warm weather, conversely, flow is slow in cool or cold weather, while dampness changes the surface look of the cured resin. Serendipitously, conditions often produce unexpectedly delicious results. The unpredictable nature of the media combined with heat from the flame of my torch draws me into a state of focus where air-bubbles, drawn to the surface, then dissipate leaving behind a glass-like surface where the focus is entirely pattern and colour suspended in a glass-like matrix.

Glass Coat allows a small window of approximately twenty minutes (which is marginally variable and contingent, again, on climatic conditions) to pour, adjust, and 'fiddle' with the substance. The 'fiddle' includes separating the resin into smaller quantities for inclusion with selected colour pigments. Glass Coat spreads quickly in warm weather which can result in, at best, too much movement and, at worst, spillage when the resin continues its uncontrollable flow. At times, again, the result can be breathtaking, or a throwaway.

The first body of work for my project is contained in small tile-sized opaque white acrylic sheet with the title *Porous Bodies,* exhibited in November 2016 in Devonport Regional Gallery's Little Gallery Project Space. My process involved the manipulation of original acrylic tile-size pieces containing resin work through a process of scanning at very high resolution for reformatting then printing onto actual shiny white porcelain tiles measuring 15 cm x 15 cm.



Figures 40 & 41: Sue Quinn, Untitled, studio interpretations and representation of diagnostic processes and their visual results in pigment in resin on 15 cm x 15 cm acrylic tiles.

Manipulations included Photoshop colour formatting that sharpens images when printed onto high-gloss white tiles. The work reflects the glaringly brightly illuminating sterile white tiles and stainless-steel; my first and profound response to the wet-lab.

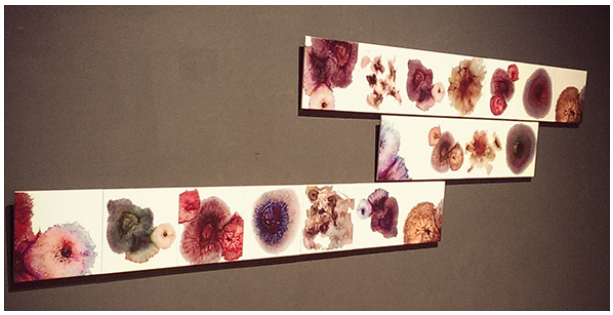


Figure 42: Susan Quinn, 2016, untitled, Ink on porcelain tiles, each 15 cm x 15 cm, from Porous Bodies exhibition

A small interactive installation component to the exhibition placed original resin and pigment acrylic tiles on a conveniently situated shelf adjacent to a light-box, custom made and configured to accommodate the 15 cm x 15 cm works. Visitors to the gallery interacted with the installation in a pick-up and put-down action.

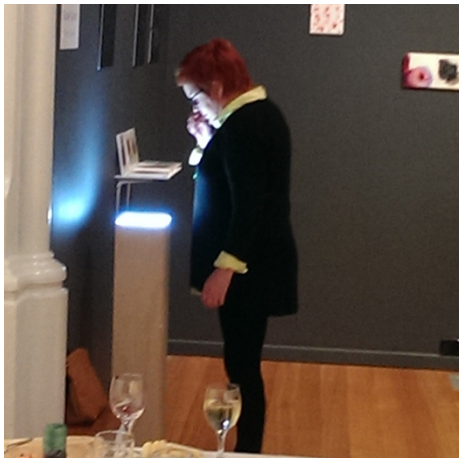


Figure 43: Susan Quinn, Porous Bodies, 2016, Devonport Regional Gallery, installation view

Light delivered another dimension whereby delicate detail could be discovered within pigmented patterning.

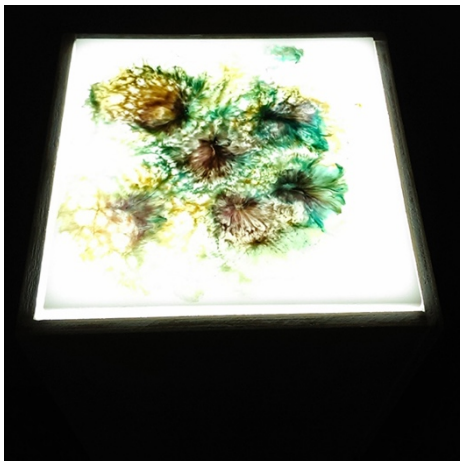


Figure 44: Sue Quinn, Porous Bodies, 2016, Devonport Regionals Gallery, installation view, light-box

On reflection, Devonport's Little Gallery's intimate space provided an ideal starting point to test my hypothesis including my emotional response to the wet-lab. Shiny white tiles provided a starting topic for studio work. I sense that each body of work carries elements of significance that contribute to the next body.

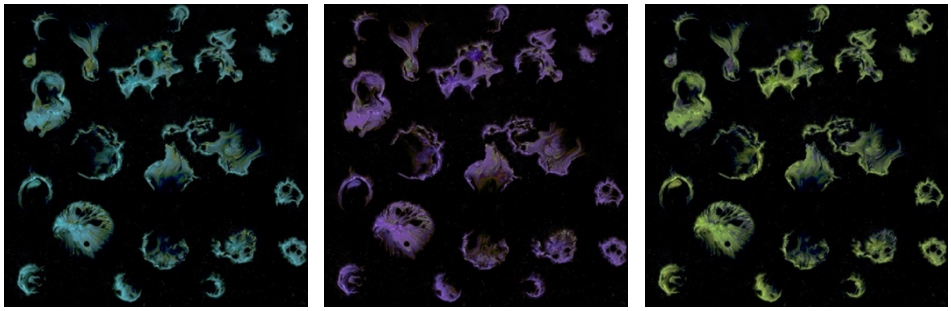
Studio: Stage Two

In July and August 2016, my research stepped-up a level when I applied for and was granted the first self-directed arts residency with the Launceston

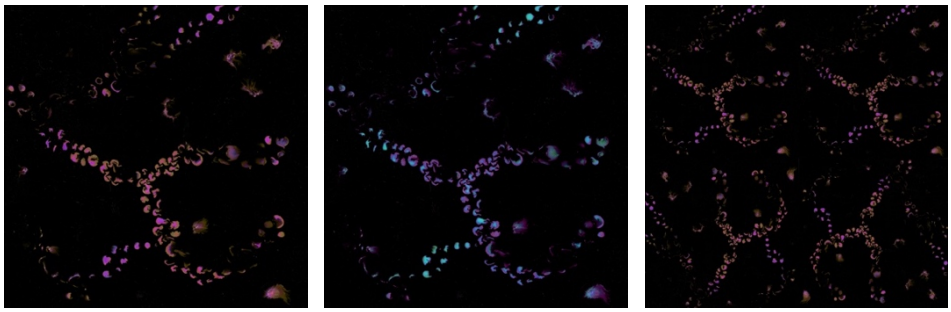
General Hospital's Pathology Department. Research involving humans is subject to stringent University ethics requirements and approvals. In the process of data-gathering, my research eliminates personal contacts with hospital patients or patient names however, each body part and microscopic piece of human viscera that I observed belonged to another human. Each deserved and was subjected to respect, confidentiality, and privacy.

Throughout the residency I was granted freedom to access five laboratories for survey and a vast amount of visual data to work with in the studio. Participation in the residency ratified my concept of patterning in biology. Looking at human material through the microscope, I witnessed patterns form in blood samples during testing procedures for types of autoimmune disease. When questioned, scientists confirmed that specific forms of patterning in results indicates the existence of particular diseases, and that scientists look for patterning in microscopic viscera and blood samples. This knowledge allowed me to expand on the speculative, and to build on empirical data obtained in a clinical setting. The experience validated other concepts of porosity, fragility, and fluidity, and the trans-corporeality of human systems with non-human entities.

In addition to new work, images used in the first-stage of studio work for *Porous Bodies*, took on a darker and more dramatic aesthetic in black backgrounds and further colour reformatting. Once again, scientists commented on a small but significant similarity with their work, previously unknown to me, whereby black velvet placed behind glass slides under the microscope provides a useful tool for gram-stained samples in diagnoses. The Figures 45 to 50 form a small selection of my speculative study of colour in the diagnostic processes of disease identification.

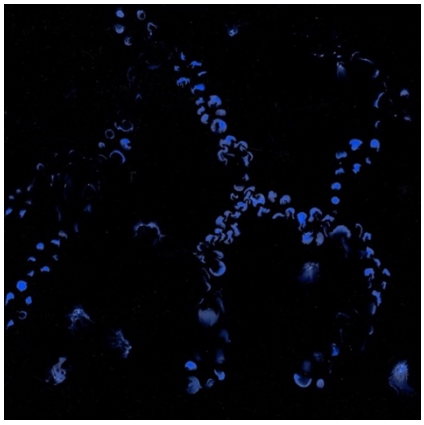


Figures 45 to 47: Susan Quinn, conceptualised human matter under diagnostic testing, 2017, pigment in resin on acrylic sheet reformatted and printed onto porcelain tiles

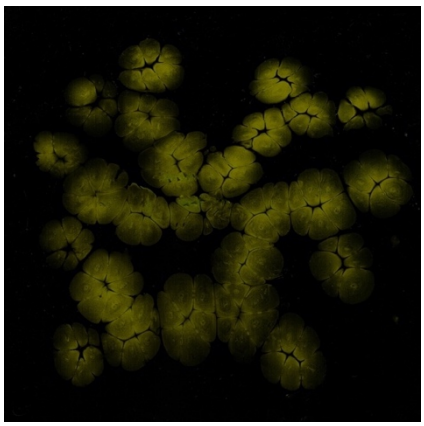
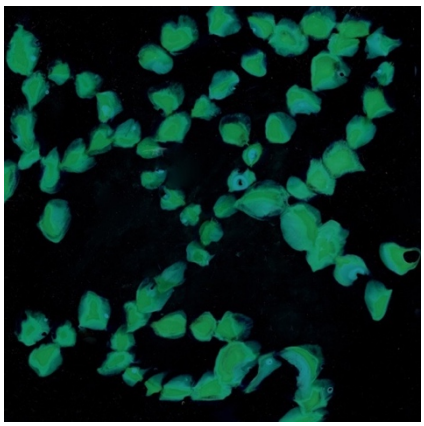


Figures 48 to 50: Susan Quinn, conceptualised human matter under diagnostic testing, 2017, pigment in resin on acrylic sheet, reformatted and printed onto porcelain tiles

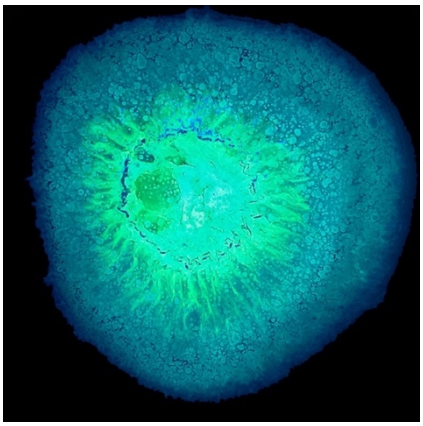
Re-formatted images printed, again, onto porcelain tiles provided a new body of work reflecting the experience of observing human material and processes in a diagnostic setting. The strategy of placing black velvet behind glass slides, used to better observe test results, provided an additional studio tool. The body of work, titled *The Beauty of Beasts*, enjoyed a long exhibition period in Launceston General Hospital's ARTrium Gallery, from February to June 2017. The term 'beasts' is a reference to abject and diabolical non-human entities living and often co-existing within the human organism. The following images represent several of those I used for this exhibition.



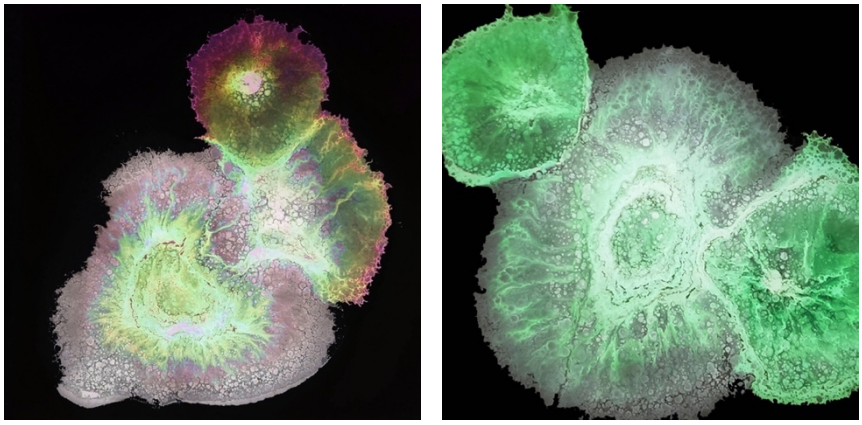

Figures 51 & 52: Susan Quinn, Untitled, 2017, pigment in resin on acrylic, formatted to ink on porcelain tiles

Figures 53 & 54: Susan Quinn, Untitled, 2017, pigment in resin on acrylic, formatted to ink on porcelain tiles

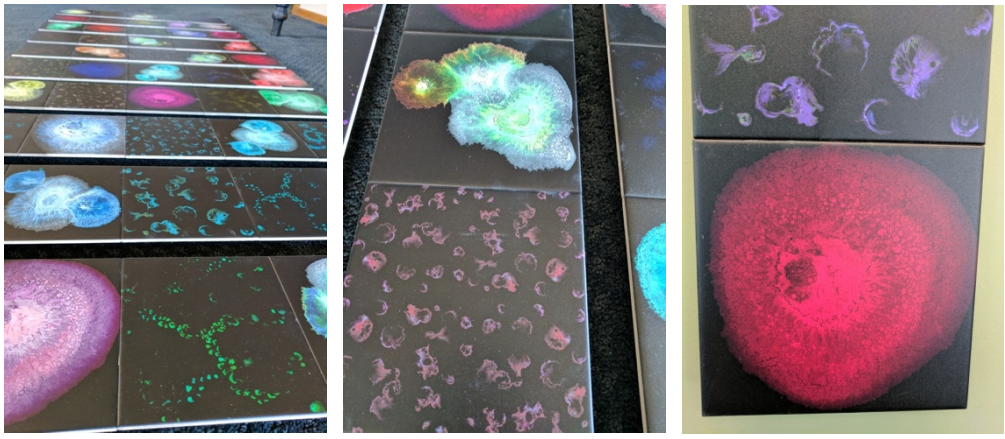
Figures 55 & 56: Susan Quinn, Untitled, 2017, pigment in resin on acrylic, formatted to ink on porcelain tiles



Figures 57 & 58: Susan Quinn, Untitled, 2017, pigment in resin on acrylic, formatted to ink on porcelain tiles

The work in Figures 51 conceptualises microscopic patterning found in blood in diagnostic processes of ANA Fluorescent screening for autoimmune disease and separation of proteins by Electrophoresis; fascinating testing procedures that held my attention and fuelled my imagination as the pathology residency progressed. The Haematology Laboratory manager assigned me a young scientist/technician for an entire week with whom I developed a constructive working relationship. Both she and I felt comfortable; she questioned my art and how the residency would be of value to my project, and I questioned the processes employed and how results are determined. I was fortunate to be afforded the opportunity to carry-out, under guidance, one of the laboratory's specialised tests; electrophoresis separation of proteins, a test that determines the presence, or not, of a type of cancer. Had I been invited to carry out a new test on a previously untested blood sample, I would have refused however, I am confident this would not have occurred. I was invited, rather, to carry out the test on an archived, previously-tested sample. The test proved positive which, I suspect, is why the sample was selected, in order that I would observe patterning in a positive result.

Figures 59 to 61 show a selection of images fresh from the printer, fixed to supports, ready to hang. Figures 62 & 63 show work hanging in both the gallery space and in its permanent home in the hospital.



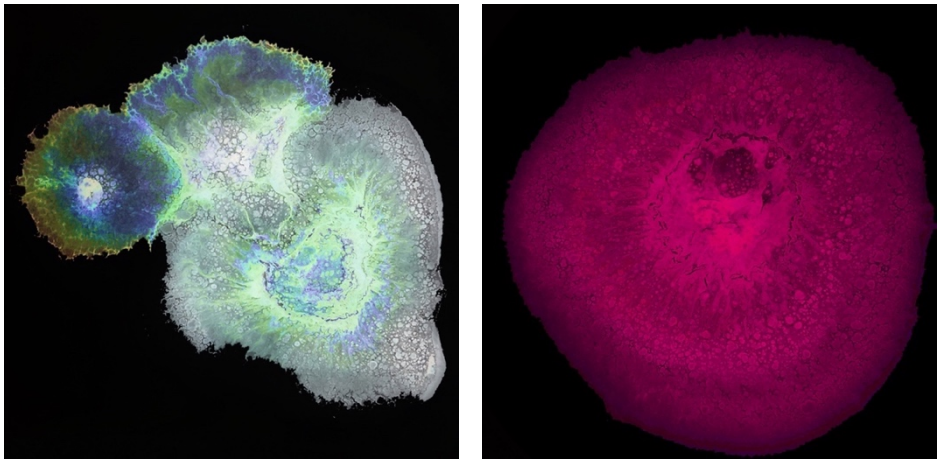
Figures 59: 60: 61: Sue Quinn, The Beauty of Beasts, 2017, works fresh from the printer for installation, 2017

Figure 62 & 63: Sue Quinn, The Beauty of Beasts, installed, work selected for the LGH Permanent Art Collection, 2017

Where patterning is not always evident when seen singularly or in a close-up view, or when repetition is not obvious, a repeating pattern completes the image. Repeating patterns formed in autopoiesis, and observed through a microscopic, inform but are not mimicked in *The Beauty of Beasts* exhibition. In addition to porcelain tiles, two experimental floor-to-ceiling, wallpaper length images hanging side-by-side conceptualise ANA florescent screening. The wallpaper concept had many admirers, largely for its overall aesthetic, and their inclusion in the context of this project was successful in its ability to demonstrate the effect of random patterning in a repeating format (Figure 64).

Figure 64: Susan Quinn, wallpaper installation, Beauty of Beasts exhibition, 2017

On this occasion, tiles in groups of five hung in a vertical orientation. In a curved-wall space, several difficulties were overcome and compromises made during installation of this exhibition due to previously unknown and surprising constraints including last-minute changes to the space. A pleasing outcome from the residency and subsequent exhibition is the inclusion of works in the LGH Permanent Art Collection.



Figures 65 & 66: Susan Quinn, Untitled, Ink on porcelain tile, 15 cm x 15 cm, from The Beauty of Beasts exhibition, 2017

Figures 65 and 66 demonstrate how dense capsules of colour form larger expanses within the main body of complex patterning. Stunningly beautiful yet diabolical cultured fungi and a variety of other entities inform these images hence the title, *The Beauty of Beasts*. The human estate is entangled with non-human processes within the body. Alaimo states, as humans, each of us carries approximately two kilograms of bacteria, many of which fold within tissues, defining our capacities, our functions, and our health (Alaimo 2012). The Medical Fungi Laboratory continues to hold some strange fascination and a curiosity for what I have come to regard as exquisite subjects. My attention was held by the abject nature of spore-producing entities, and that a perverse microscopic living organism has the capacity to multiply and colonise within the respiratory systems and intestinal tracts of individuals with compromised immunity. I have a notion to further research this abject yet beautiful phenomenon.

Studio: Stage Three

The Beauty of Beasts exhibition heralded the completion of a lengthy dalliance with the concept of shiny white tiles and my use of tiles containing speculative images of biology. Meanwhile my studio experiments continue to deliver images that strive to engage a viewer with aesthetics of porosity, poiesis, fluidity, and fragility. Previous work, for *Porous Bodies* and *The Beauty of Beasts*, contained a number of pleasing elements in detail and use of colour. Tiles, however, constrained notions of fluidity.

Having exhausted possibilities within a perceived fixed format; that is, when edges prevent the work from delivering a continuous or flowing aesthetic, and the work ends at the edges or borders of its supports; my research turned to ways that might deliver exactly what and how I visualise yet experience trouble expressing. Among the possibilities I considered video and projections. Whereas I had a sense of how the art should work aesthetically, finding a format that effectively delivers this escaped me. It was then that I received a link to an artist working in resin and glass; similar transparent mediums to those used in my studio. The work of artist Dustin Yellin retains a

fluid quality and the aesthetic depth my work is striving to achieve. (Figures 67 to 71) By simply adjusting the technique to fit my needs, the process I experimented with for a third body of work delivered a technique tailored to suit. Yellin's large-format, full human size work on glass resembles what Yellin describes as a 1400 kg glass slide containing an abstracted human.

Figure 67 & 68: Dustin Yellin, Psychogeography 99, Sea in the Stomach for the World in Seven Parts, 2017, series of 120, glass, collage, acrylic, full image & detail, larger than life-size, exact dimensions unknow

Figures 69 & 70: Dustin Yellin, Psychography 99, Sea in the Stomach for the World in Seven Parts, 2018, series of 120, glass, collage, acrylic, installation and detail

Figure 71: Dustin Yellin, Schwitter's Kiss, 2013, glass, collage, acrylic, 45.7 cm x 43.2 cm x 14 cm, https://www.astspace.com/dustin_yellin/switter's_kiss

Yellin builds each sculptural piece from scraps of media taken from magazines, dictionaries, and other texts, that become an archive or reliquary in the shape of a human. The result is a Hieronymus Bosch style landscape within the corporeal body encapsulating how Yellin sees the human; not our flesh and bones but our memories, experiences, thoughts, history, and future. Walking around and amongst Yellin's sculptures, and finding new angles from which to view the work is an exploration of the entities captured inside (Collins 2015). Here started my journey into an amalgam of two-dimensional and three-dimensional experiments.

Notwithstanding my earlier exploration of what constitutes two-dimensionality and three-dimensionality; questioning if two-dimensionality in fact exists, the two-dimensional referent is how the image begins, three-dimensionality is the configuring of individual image layers in a completed model. In early experiments, the aesthetic unfolds in layers of clear acrylic sheet to which transparent resin is applied. Small quantities of resin containing additions of pigments form florets and small explosions of colour. Each layer is different to the last and to the next. Delivery of colour continues through the entire process as layers build to form a three-dimensional model. Initially, there was

no plan to follow or a deliberately devised sequence. Its final process is precise in its applications of medium and pigmented detail however; final models are configured using only instinct and chance.

Biological models: Bragg planes

At this stage I began to narrow the aims of the project to expressions of porosity, fluidity, and fragility; to elicit an experience and appreciation of those qualities within the organism's interior ecology. My models, the artefacts, aim for an aesthetic delivering a sense of porosity, of delicate membranes within the organism characterising its inherent ability for fluid movement and carriage across fragile boundaries.

In a serendipitous conversation with a fellow artist and studio mate, I discovered Bragg planes (University of Cambridge 2003); a discovery in the diffraction of X-rays by crystals delivering the first biological models. My fellow artist, who recently passed away, was a scientist and, both he and I identified a tenuous link in my models of biology to a historic breakthrough in science that in 1912 delivered new ways to observe biology. A young scientist, William Lawrence Bragg, and his father, William Henry Bragg, formulated the relationship between atomic structures of crystals and its X-ray diffraction pattern to provide a tool which has since revolutionised our understanding of the structure of matter ranging from minerals, pharmaceutical materials, and catalysts, to DNA proteins, and viruses (Figure 72). Later, in 1937, the younger Bragg, with the assistance of fellow scientist Max Perutz, used the aesthetically beautiful X-ray diffraction patterns to model a structure of haemoglobin. Research, interrupted during WWII, resumed in 1945 when modelling of crystalline proteins of haemoglobin and myoglobin continued. The technique developed further for use in the study of other suitable biological material (University of Cambridge 2003).

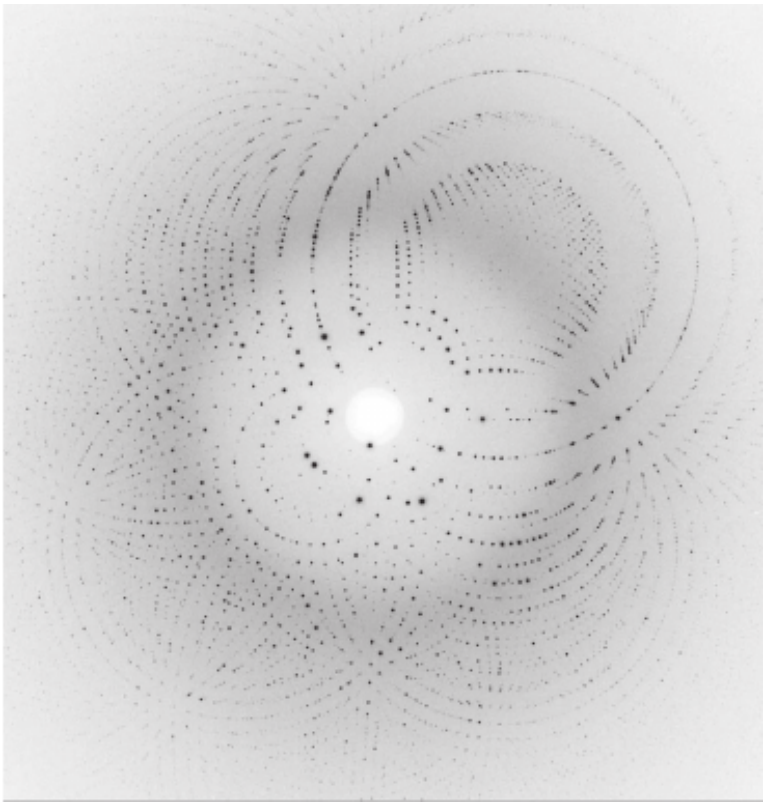


Figure 72: http://www.researchgate.net/figure/A-Laue-diffraction-image-from-a-protein-crystal-collected-on-the-MAR345-image-plate_fig1_78023

This was the first use of the X-ray technique in the study of molecules which later became deeply involved in the discovery of DNA structure, unravelling helical diffraction and folding polypeptide chains (University of Cambridge 2003). The connection I make with Bragg planes is, foremost, that the human organism's complex layered qualities resonate with my concept of porosity, fluidity, and fragility, that I present in three-dimensional models.

Combining Dustin Yellin's method in his creation of corporeal works with the Bragg planes scientific model provided a studio method to observe conceptualised human biology. In addition, my models acknowledge a significant time in history, presented in a conceptualised representation of Bragg planes. By this I mean, that to visualise my expression of the organism and its processes, the Bragg planes models in combination with transparent layering provided opportunities to visualise my concepts in three-dimensional models. Light allows the eye to travel through each layer in a similar aesthetic to X-ray diffraction. As the technique unfolds and develops, ideas for

presentation begin to form. Focused light in the form of lightboxes provides a vehicle so that each layer in a model is illuminated to be observed singularly or in totality. Scale is a major consideration. Dimensions, spatial consideration, and the physicality of models in installation formed into ideas for my exhibition.

Importantly, in an earlier moment of clarity, I discovered ways to simplify a visually complex subject; imagining the unseen, conceptualising biological processes, flagging a significant time in history, expressing the invisible in three-dimensional models, providing a new way to think about the human organism, thus providing clues to a changed bodily concept through art.

Saving the best to last: beautiful and diabolical

In the same way when, as children, we saved the best, the nicest, our favourite part of a meal to be savoured last, I saved the best, most interesting and captivating laboratory in the residency until the end. The residency concluded in an audit of the medical fungi laboratory, a deliberate move; leaving it to last believing it would hold no more interest than other laboratories in the department or, that it might, in fact, be the least interesting. Surprisingly, it is the referent experience I feel most compelled to repeat. In this sense, leaving the best to last alludes to where this experience is placed in this paper. The scientist in charge, the manager, demonstrated a passion that I found bemusing until I observed his charges in the most tightly controlled environment; viewing specimens while gowned, masked, and gloved and, at times, within the safe confines of a fume cupboard.

Medical fungi make beautifully fascinating subjects. As an extension of cytology, the medical fungi laboratory includes the study of parasites and all manner of foreign entities where invasive entities are examined under strict conditions; I will never again turn over or spread a compost heap, nor handle potting mix without protective gloves and an effective mask. I observed microscopic fungi that live in the respiratory apparatus of those with suppressed immune systems. The environment, Alaimo contends, is a world

of fleshy beings, each with its own needs (Alaimo 2012). I discovered what the term porosity means at its most insidious; when foreign and invasive entities cross delicately porous membranes to colonise within human inner ecologies where host conditions provide perfect environments. Humans and non-human entities often exist in a symbiotic relationship, each complimenting the other. Alternatively, there exists insidious parasitic relationships that result in disease and often in death; the abject 'other'.

Developing a subtle aesthetic of abjection is difficult without, for example, overt use of contradictory aesthetically pleasing with abject and toxic substances, a tactic successfully employed in Helen Chadwick's *Wreaths to Pleasure* and Mona Hatoum's projected bodily interiors. In my final two exhibitions, the abject is not visible rather, it is alluded to within the nature of layers in notion of porous boundaries and fluid movement using pigments on transparent media in three-dimensional models.

Sawtooth ARI: *Poiesis & Porosity: Models of Human Biology*

In the final twelve months of candidature I brought together the elements of my research in two solo exhibitions. The two exhibitions in March and August 2018, explored the use of light in spaces where my work was installed; one in a dark space that tested the veracity of a light-box concept; the other in a space bathed in natural light. Both delivered opportunities to test scale, light, transparency, where working with opposing qualities might deliver critical feedback influencing final decisions. The first in March 2018, at Sawtooth ARI's Dark Space, or Media Room; the second, in August 2018 at SPACE Gallery, Scotch Oakburn College. The Sawtooth ARI gallery provided an ideal space to test my idea for light emitting from light-boxes in order that little else was visible inside the space. My concept for this exhibition engages with microscopes where, without a back-lit light-source, the object to be viewed and scrutinised would be unavailable to the eyes. My intention, for Sawtooth's Dark Space was a space free from distractions; the work, inside light-boxes, is all there is to see.

The Sawtooth show saw several changes to what I considered were well-thought-through plans. The intent was to set the scene with lightboxes placed strategically within the dark space. First, I planned for twelve boxes using plywood coated with theatre-black paint. Internal dimensions of each box set at 15cm x 15cm. The concept is, as an audience enters the space, light emitting from lightboxes guides each viewer from box to box, artefact to artefact. I dismissed the plan for twelve boxes six weeks out from the exhibition opening. When imagining the installation, which is the only way to test what exists only in the mind, light emitting from twelve boxes would be considerable, effectively shedding too much light in a dedicated dark-space. I devised a new plan for eight smaller boxes; each box's internal measurement only 10cm x 10cm. Tall, narrow, and black; a microscope is long, narrow, and (usually) black.

Sailing close to the wind is a precarious state in terms of time. I had certainly been aware, at some deeply conscious level, that one or more elements of the exhibition did not sit comfortably. Changes to the inner dimensions of the lightboxes automatically changed the outer dimensions of acrylic image supports. My initial choice, for 6mm clear acrylic sheet cut to 15cm x 15cm, increased to 10mm in thickness, while outer dimension decreased to 10mm square. I concluded, 10mm thick acrylic allows layers to be viewed with enough space between that the totality of the image is not overly confused. My thoughts then turned to the prospect of glass; 10mm thick Super Clear glass for its ability to provide absolute clarity. The properties of Super Clear glass eliminate the green tinge associated with normal glass. Thoughts of glass ended abruptly when I received quotes. Super Clear glass is priced out at per one-third of a square metre per piece, regardless that one might require pieces measuring only 10cm x 10cm; I required eighty pieces costed out at per one-third of a square metre each.

The visually aesthetic differences of clear acrylic versus Super Clear, indeed all glass, is subtle; Super-Clear glass delivers absolute clarity. Acrylic, too, exhibits similar clarity. Its clarity however, cannot be maintained. By this I mean, acrylic, over time, develops a barely discernible cloudiness that might

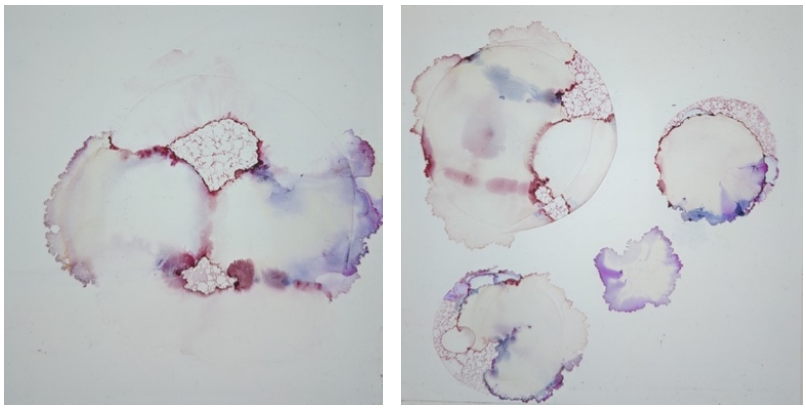
be noticeable only when placed beside glass. I would suggest this is due to its innate ‘softness’ compared with glass. Its properties might not stack-up favourable against Super-Clear glass in terms of clarity and longevity nevertheless, the material delivers qualities more than adequate for the purposes of exhibition and far beyond where, placed within a light-box, beneath a piece of acrylic that is easily replaced, the material is protected from necessities of cleaning and other processes that might dull the material’s surface.

When acrylic is cut by experts, its edges are perfectly smooth but opaque. When edges are flamed (polished), minute scratches and barely discernible unevenness melt into invisibility. Opaque edges have a place in my work however, my preference this time was for flamed edges, allowing the acrylic to extract maximum available light to be reflected throughout the model. Other minor issues resolved without too much difficulty through discussion, problem-solving, determination, and expert advice.

Accuracy is imperative in small joinery work hence, I decided a joinery shop might deliver the best option for cutting plywood accurately. Sourcing a joinery shop in my general vicinity, to accurately cut plywood for eight lightboxes, proved confusingly impossible. A small job is not an attractive job. In frustration, I called a well-known and highly-respected local furniture designer who was happy to assist. A meeting over a beer, armed with a cutting list, developed into a productive brain-storming session where ideas for a more suitable material, construction, and lighting solutions were thrown around and subsequently resolved. The meeting concluded with an agreement that the designer would cut, construct, stain, and deliver finished lightboxes. An appropriate project, he concluded, for his apprentice. I took delivery of eight beautifully constructed, elegant boxes with invisible joins that might have evolved from a single piece of timber. It was disappointing, I thought, that in a darkened space they would not be visible. My plan for more than adequately adequately constructed, but rough-and-ready plywood boxes morphed into expertly constructed vehicles for my artefacts; my models of biology that appear to float in the blackness of a dark space.

Painting biology

Finding the perfect media to express notions of fragile biological processes, porous boundaries, transparent layering in three-dimensions found me experimenting with watercolour paints, inks, and transparent pigments. Watercolour delivers opaque colour making it difficult to see through to layers beneath. Inks and transparent pigments became my mediums of choice for this body of work. Eighty pieces of hand-painted acrylic form the entire show; ten pieces in each lightbox forming eight perfect cubes, each 10cm x 10cm x 10cm. I developed feelings of ambivalence to the polished edges of my models, that this might not have been the best choice. I became aware of this prior to the exhibition but too late to make the necessary changes. I magnified these feelings out of proportion. The clarity of polished edges produced a visible effect of layering around all sides. Whereas the purpose had been to produce layers; my ideas was for uninterrupted layers, a perfect cube, where evidence of layers lay only within the colour and patterning within each cube. Disappointment lay in the visible lines created around the boundaries where one piece of acrylic meets the next. Figures 73 and 74 are individual pieces laid out singularly; Figure 75 demonstrates the layering effect when ten individual pieces are laid on top of one another. When layers form cubes inside light-boxes, layout of the light-boxes, individually or as a group, required careful consideration. Ideas form for a carefully spaced line-up, as one would see in a line-up of microscopes in a laboratory, might resolve the body of work.



Figures 73 &74: Sue Quinn, 2018, individual images for layering, pigment on acrylic

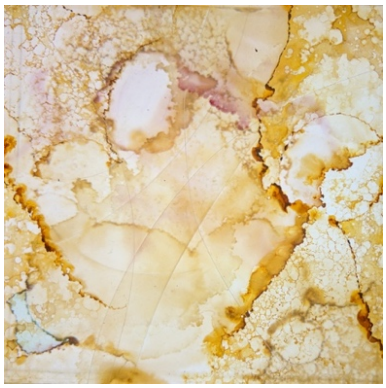


Figure 75: Sue Quinn, 2018, layered pieces (10) backlit on light-box, dimensions 10cm x 10cm x 10cm, pigment on acrylic

Alternatively, the idea of light-boxes in a circle, again, carefully spaced as one might observe in a laboratory when scientists sit around a large table to discuss what they are observing through their individual microscopes. I could wax-lyrical about the circle and my reasons to place the lightboxes in a circle; its spiritual significance, its significance to the human body and to biology; cells, cycles, birth, death, decay, and rebirth, cyclical biological processes. In reality, the decisions delivered a practical solution, resolving technical issues. In practical terms, reality dictated that in order to connect each lightbox to a power source, it was required to form part of a circle.

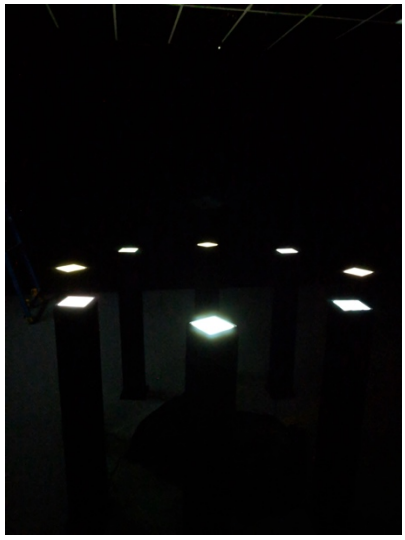


Figure 76 & 77: Sue Quinn, 2018, stacked acrylic for layering, circle of light-boxes

Eight lightboxes required four power boards, two double adaptors each, and two fifteen metre extension leads. In a darkened space, for safety reasons, extension leads, double adaptors, and power boards can be safely contained only within a circle. In order that no human could connect with wires, plugs and electricity, spaces between lightboxes was made deliberately narrow. A dark cloth provided an effective covering to render the inner circle all-but invisible within the darkened space (Figure 77).

My feelings for this body of work vary; individual paintings successfully delivered transparency, also, groups of ten in a cube portrayed the depth I envisaged. Each cube sits inside its lightbox – not on top – therefore, the gap between the opaque light diffuser and the top of the box is exactly ten centimetres. There is no space between a cube and the white walls containing it. White walls enhance the visual evidence of delineating lines between layers.

A de-briefing session with my supervisors included discussions and alternate views of the models. Voicing my concerns and slight disappointment at the visibility of layers of acrylic within lightboxes was met with surprise, that visibility within the models, exposing layers, forms an important element within my concept. Where I preferred that each small painting formed layers within an invisible matrix, it was expressed that discoveries made visible in edges might be important within notions of membranous boundaries or borders in addition to the Bragg planes concept.

Studio: Stage Four

Plans for my solo show at s.p.a.c.e. gallery began forming before installation of the Sawtooth exhibition was complete. s.p.a.c.e. gallery enjoys an abundance of both natural and artificial light; an ideal location to show-off beautifully constructed, elegant light-boxes. My aims for this event were twofold; firstly, to show work that contains a reference to the manner in which medical scientists view sourced bodily material in magnification and, secondly, to expose porous layers.

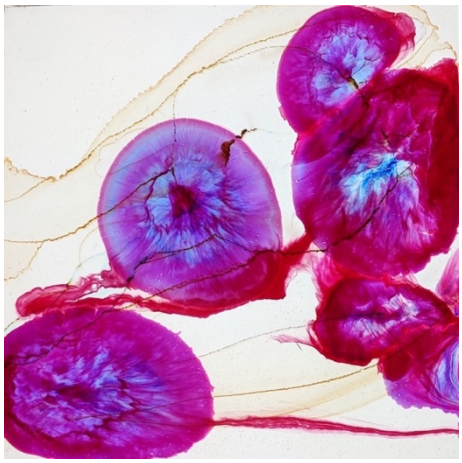


Figure 78: Susan Quinn, 2018, Untitled, interactive component from *Shared Flesh* exhibition, pigment in resin on acrylic, backlit on light-box, 10cm x 10cm

Figures 79: 80: 81: Sue Quinn, 2018, *Shared Flesh*, work ready to install, interactive installation, & installation view

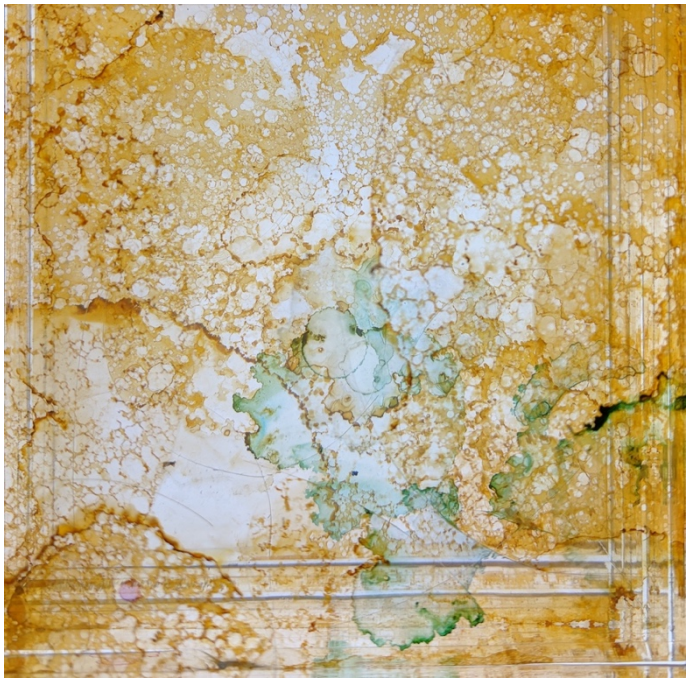


Figure 82: Susan Quinn, 2018, *Shared Flesh*, pigment on acrylic, layers inside light-box, dimensions of model 10cm x 10cm x 10cm

Launceston's s.p.a.c.e. gallery is configured with one long off-white wall with a wall of glass directly opposite; an ideal, well-lit space for 2-D wall-hung work. The space is busy with heavy foot traffic throughout the day. I used the wall for my light-box installation against which seven boxes stood in addition to an interactive installation consisting of a larger light-box inviting an audience to pick up, put down, and layer pieces of patterned acrylic in any combination. My decision to include this element in the exhibition was primarily that s.p.a.c.e. gallery is situated within a senior school's Performing Arts Centre. The school is known for its vibrant arts curriculum. The sticky and heavily finger-marked acrylic pieces evidenced much pick-up and put-down activity. The busy nature of the gallery was prohibitive for a light-box circle hence, my choice was limited to a line-up of boxes against the long wall., While a degree of drama available in the dark space was lost, this exhibition highlighted the potential for interaction as a strong element in the installation.

Whereas this exegesis describes the importance of colour in my project, and how I use colour in my studio work, it is an important element in my study tool; that is, patterning in colour in repetition. Colour in patterned repetition

delivered the resource I needed to successfully complete my studies in anatomy and physiology. Thinking back to James Turrell; my work requires light to enhance minute detail and my use of colour, whereas Turrell's work requires colour to enhance his use of intense light. There are no comparisons in my work with Turrell's besides the one similarity; that is, the use of light to enhance my colourful models, as it is used by Turrell, not only to enhance his installations, but to affect a profound psychological response. The referent, again, is the microscope hence, I use back-lighting as it might be used in microscopic investigations.

With a critical eye, I weighed-up which works most clearly interpret my project's concepts. Light-box works is the prevailing theme. In addition, I aim to include an interactive light-box element to which a viewer is invited to pick-up and put-down pieces of acrylic in any assortment of combinations; as a scientist would do with petri dishes or glass slides. Figures 83 to 86 demonstrate how single images take on a new aesthetic when layered. Figure 87 contains six individual images prior to layering. Figures 88 and 89 demonstrate the results of layering of the six individual images in two different configurations. The end result takes on the complexity and richness of Islamic patterning albeit in an abstracted format.

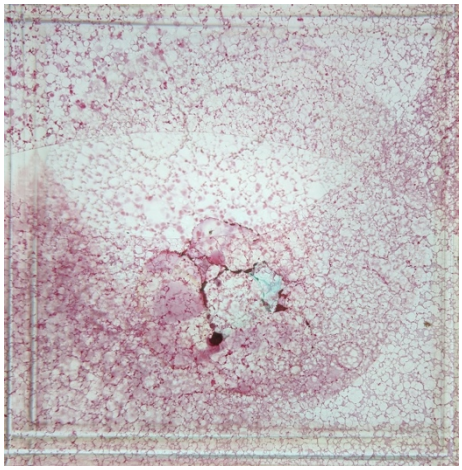


Figure 83: Susan Quinn, untitled, 2018, layered images (10) inside light-box, pigment on acrylic

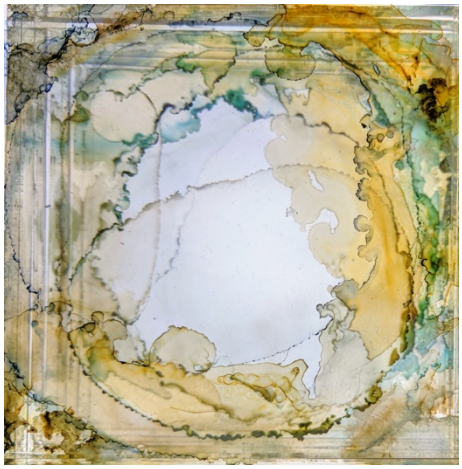


Figure 84: Susan Quinn, untitled, 2018, layered images (10) inside light-box, pigment on acrylic

Figure 85: Susan Quinn, untitled, 2018, layered images (10) inside light-box, pigment on acrylic

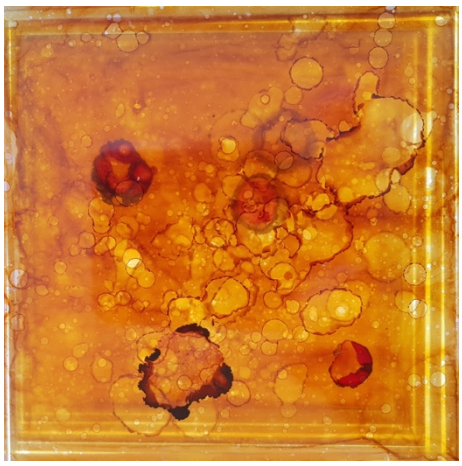


Figure 86: Susan Quinn, untitled, 2018, layered images (10) inside light-box, pigment on acrylic

Figure 87: Susan Quinn, 2018, individual images for layering, pigment on acrylic

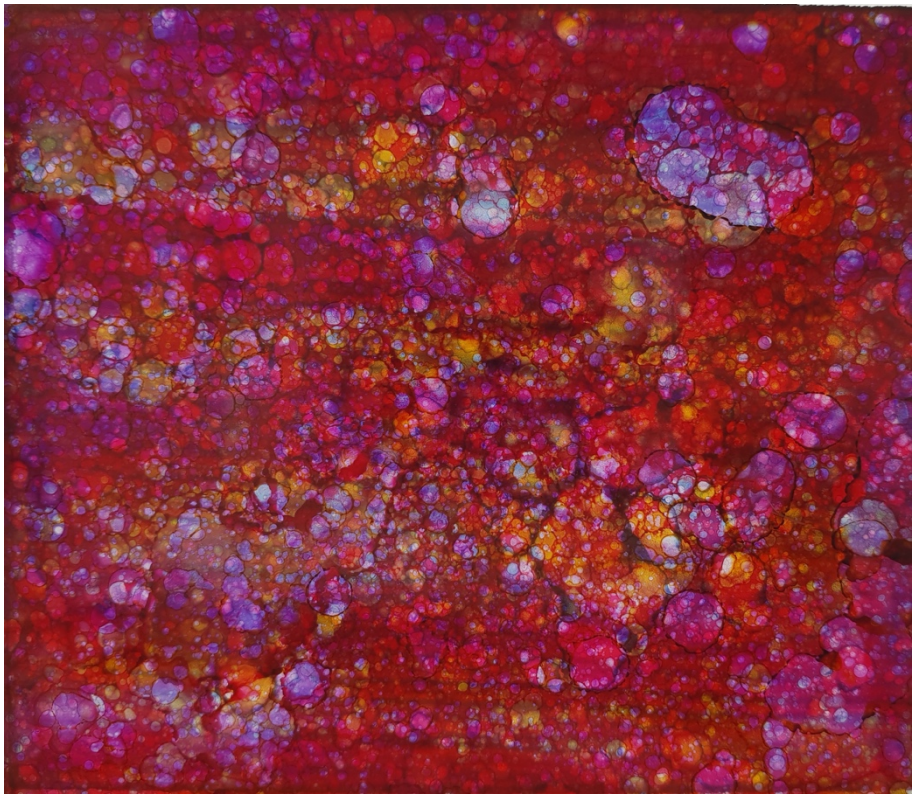


Figure 88: Susan Quinn, untitled, 2018, layered images (4) backlit, pigment on acrylic

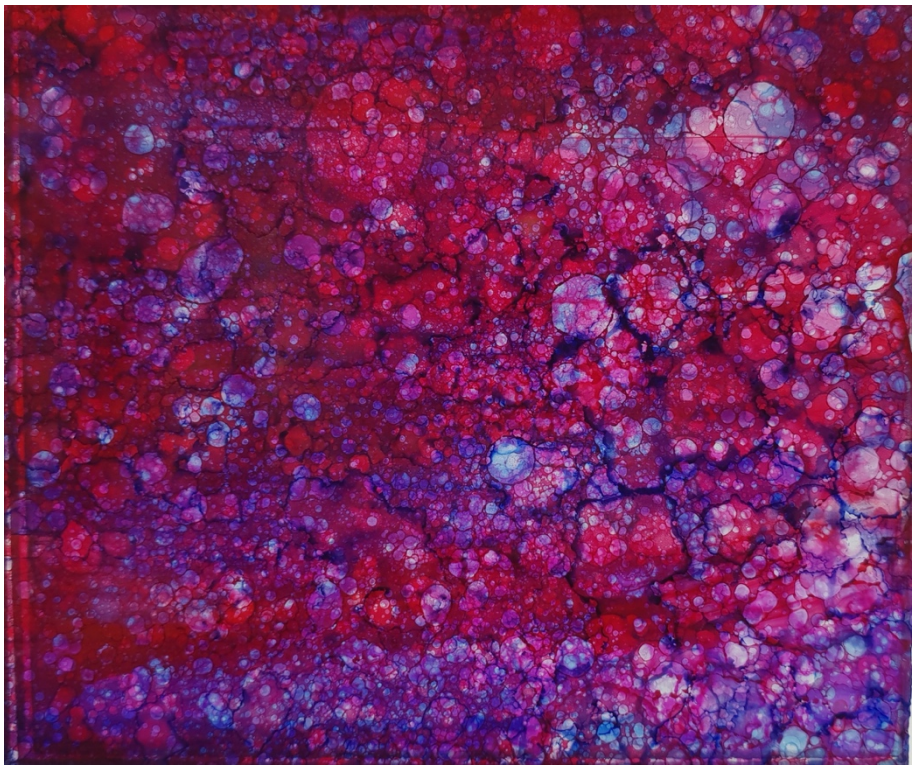


Figure 89: Susan Quinn, untitled, 2018, layered images (4) backlit, pigment on acrylic

Whereas more recent works better reflect my concept of porosity and poiesis across fragile membranes, early work demonstrates the 'journey'; how images progressed to more closely reflect my concept where a shiny white tiles element endures. I now consider and revise works to include (and preclude) in the assessment exhibition that best supports my concept of *Porosity and poiesis across fragile membranes: patterning fluid arrangements in human biology.*

Experiments and testing of ideas with video continued. A moving image is accomplished only with the assistance of a highly regarded video artist; Darryl Rogers. I don't doubt, given time and a good teacher, I might accomplish video software manipulation however, the constraints of time render this impossible. In addition, I am aware of the complexities of high-end video software and its ability, in the right hands and using carefully selected still images, to successfully format still images into a video that achieves my aims. Darryl Rogers is highly accomplished in video editing software. In

lengthy talks and messaging, Darryl understood my concept of fragile, mobile, porous, fluid boundaries; the dynamic human organism's biology. Darryl's ability delivered my centrepiece video. Meanwhile, in a moment of clarity, I return to the beginning, to shiny white tiles; my first and affective memory of the wet-lab. It makes sense, therefore, that the shiny white tiles concept forms the enduring theme of my work.

A single video projecting directly onto the floor forms the centrepiece of my installation where white tiles cover a section of floor to become a screen for porous, fluid movement, where boundaries move and break and allow seepage and spillage over its edges. White tiles atop a small bench stands side-by-side with a light-box where an interactive element invites an audience to pick up and put down acrylic pieces containing pigment in abstracted patterning. This interactive installation delivers an opportunity for visitors to stack and layer, to form different pattern and colour combinations. These elements accompany the circle of eight light-boxes in addition to a pair of floor-to-ceiling, wallpaper lengths of dark paper containing repetitive patterning. The images hang side-by-side. Deliberately dimmed gallery lighting barely illuminates the images on paper in the darkened space.

Conclusion

Kristeva tells us it is the compelling, raw, insolent thing in full sunlight, it is that thing no longer matching and therefore no longer signifying anything, the breaking down of a world erasing its borders. It is the corpse, seen without God, outside of science, the utmost of abjection – 'death infecting life' (Kristeva 1982:124).

I return, now, to the premise of *Porosity and poiesis across fragile membranes: patterning fluid arrangements in human biology*. To that affective moment when human science concepts confounded and confused me. I am reminded; Kristeva's full sunlight is the glare of harsh lighting on shiny white tiles. The wet-lab is inside science, but its brutal mutilated bodies took me outside science. It was, the utmost of abjection; 'death infecting life' (Kristeva 1982:124).

And so, the beginning of the exploration, a journey of discoveries that has posed yet more questions. I questioned if my observations of clinical testing procedures concur with my proposition. This is to say, does patterning form in microscopic human biological material? Through the lens of a microscope, in a clinical setting, I witnessed the movement of human cells forming distinct patterning in a purposive, expressive narrative. In effect, I discovered a way to build on empirical data obtained from clinical observations in the pathology laboratory. Central to the argument is how I navigated the complexities of human anatomy and physiology. What I see with my eyes is complex whereas, what I see in my mind provides a less complex alternative. The project invited others to see biology as I see it, thus a unique expression emerged.

Porosity, pattern, poiesis, colour, and fluidity are key elements that I addressed throughout the project. I discovered that the human organism is unstable, that the porous qualities of the body's fragile membranes affect trans-corporeality, how porosity enables both parasitic and symbiotic relationships with the 'other', and its profound effect on our personal biome.

My research revealed the ways in which pattern is intrinsically embedded in our lives, organisationally and psychologically. I witnessed the mechanisms in poiesis, and autopoiesis, seeing patterns form within the human body's biological systems, discovering also the cultural significance of complex patterning that is more than simply decorative. I discovered the significance of colour, its effect on the psyche when coloured light is imbued with psychology in mind-altering installations. I discovered that the human is a fluid, unstable organism, that fluidity enables each of poietic patterning, porosity in trans-corporeality, and in its homeostatic regulation.

As an artist, I am constantly, both consciously and unconsciously, absorbing information and visual data that influences intent and modes of expression that rely on visual correspondence. The project emphasises my physical engagement with process in an approach that engages materiality and media in a heightened awareness of scale and format as an effective form of communicating ideas. My understanding of visual context is now largely enhanced. Small illuminated works provided a creative syntax; this is, a visually structured arrangement responding to gathered data. In addition, a large-format video projection delivers immersive, embodied qualities of 'being there' within the fluidity of poietic seepage.

With an emphasis on the microscopic, four public solo exhibitions of work tested my concept and my curatorial skills. I learned to be dexterous in my approach, adapting to four very different spaces. One exhibition space challenged my expectations while the remaining three spaces provided ideal conditions for placement and lighting. The first was a small space where I tested the shiny white tiles' referent; the second was a busy hospital thoroughfare where my work shared wall-space with other material; the third was a darkened space in which an audience embraced a type of intimacy using the microscope referent and where I tested the layered Bragg planes referent. The fourth was a highly illuminated space where an audience of predominantly teenage students, curious about studio materials and processes, engaged with the work in a pick-up and put-down action. My aim here was those considering a career in the arts might one day acquire new

knowledge through collaborative projects with scientists; likewise, future scientists might consider the value of participation in collaborative projects with artists. Either could derive enormous benefit in breadth and depth and a source of new knowledge. Estelle Barrett explains;

> Scientific knowledge, which is predicated on description or naming, can only constitute *partial* truth about reality. The artwork or aesthetic image ruptures and transgresses the rules and codes upon which naming or the fixing of meaning relies. Its structure or style is polyvalent and opens on to new horizons of meaning by short-circuiting accepted codes and ways of looking. This production of knowledge is dependent on interactive experience . . . (Barrett 2013:67)

Science is captivating – its images spectacular. Lay people, it seems, find scientific concepts operate in extremes and remotely. Interdisciplinary research in the form of artists exploring the world of science through residency opportunities, offered or found, delivers tools for interpretation and conceptualising that shift how we see difficult disciplines and as a way to negotiate scientific concepts.

Art practice allowed me to negotiate the complexities of human science, delivering a series of colourful flow-chart style tools of understanding and recall. Art changed the way I see the human organism. The visually informative pathology residency delivered another level of understanding complete with a different set of visual stimuli to this projects concept of colourful patterning in dynamic human material. My research embraced the fluidity of human biological processes and systems, to find a unique expression in a speculative study of human biology. My assessment exhibition reflected the breadth of studio research, from the affective shiny white tiles, the colourful flow-chart style study tool of recall, observations in the clinical setting of a busy pathology laboratory, to discovering Bragg planes models of dynamic biology that I embraced in layers of colour and pattern. I gained new studio skills, where experiments with materials

previously known to me responded in surprising ways using different methods of application to affect new reactions.

In addition, my research posed new questions and the prospect of research stemming from this research experience. Observing human medical fungi and parasites captivated my imagination that developed into a fascination and a need to know more about the fleeting life-cycles of parasites and the ephemerality of fungi. Future exploration includes the visual qualities of mycological organisms and lichens' and other pattern forming organisms in addition to developing contacts with mycologists and other experts in their fields, that might lead to collaborative projects. I feel confident, *Porosity and poiesis across fragile membranes: patterning fluid arrangements in human biology* represents only the beginning of my years as a researcher.

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